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PITTSBURGH, PA.

THE IRON TRADE REVIEW

Vol. LXIII Cleveland, October 10, 1918 *No. 15*

Peace Talk Causes No Sign of Letup

Steel Trade Glances Casually at Headlines and Returns With Greater Interest to Task of Producing More Shells, Rails, Ships and Such Material to Back Up Gallant Lads Fighting Abroad

AMERICAN iron and steel trade looks upon the latest German peace drive with more or less academic interest for the moment; but with all confidence in the valor, staunchness and resourcefulness of our troops on the firing lines to force a more repentant state of mind upon the teutonic powers than they yet have exhibited, the industry has returned with redoubled vim to the production in even greater volume of iron and steel products for war uses. In pig iron and steel ingot production alone new records have just been established. In fact, the entire industry has just begun to attain the desired momentum on war activities for which plans have been maturing for months. The most satisfactory results still are expected in the immediate future with the enlargement of resources for output to be gained by additions such as are offered.

Pig Iron

With a most satisfactory and united effort, blast furnace interests in September produced a daily average of 113,765 tons of pig iron, the highest average on record. But as it was a 30-day month, the total tonnage output did not quite reach that of October, 1916, which is the record. The September output was 3,412,955 tons, a considerable gain over August. To improved quality of coke and more favorable weather conditions are ascribed this satisfactory increase. Several stacks went out of blast but others are preparing to take their places. Allocations by the institute committee appear to engage all attention of furnaces and general trade inquiries even for next year's deliveries receive scant notice. Illness of workmen does not appear to have affected furnace production as in the case of mill activities especially in the East. Further care by allocation authorities is noted in the conservation of pig iron going into such lines as cast pipe, implement making, etc.

The production of finished steel has taken expected shifts, and such lines as sheets, wire, etc., are continuing to give way to greater concentration upon the output of shell steel, ship plates, etc.

Finished Steel

Shortage of steel bar and labor supplies is operating to curtail output of such products as nuts and bolts although destined for government use. Plate mill output in the East has been cut somewhat by the influenza epidemic affecting certain manufacturing centers, but this is believed to be only temporary. Shipyards are receiving satisfactory tonnages of steel so that enlargement of the actual building program at some yards is expected in the near future.

Restricting Brokers

Indications appear to be strengthening that Washington authorities are moving to restrict even more than they have done the activities of middlemen, this in the resale of semifinished steel especially. Jobbers declare they are finding more difficulty in replenishing stocks and some mills frankly admit they are unable to furnish jobber customers even with their legitimate supplies. This situation does not appear to have improved in the past week and may not in the immediate future.

Lake Superior iron ore shipments fell off slightly in September, due partly to less satisfactory car supplies at lower lake ports. It is expected, because of heavy commitments of coal to the northwest and grain for our troops abroad, October will witness the practical ending of the present lake ore movement. Actual needs of consumers have been pared down nearly 2,000,000 tons and the total lake movement is expected to run between 61,000,000 and 62,000,000 tons for the season. This will insure an ample supply, however, it is believed. Steel corporation blast furnace operations are reported at 92.7 per cent of capacity and ingot operations at 100 per cent.

OCTOBER 10, 1918

THE IRON TRADE REVIEW

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An Exhibition With a Purpose

A GREAT war exhibition is in progress this week in Milwaukee under the auspices of the American Foundrymen's association and its importance fully justifies the attendance of the large number of prominent manufacturers, army officers and government officials who were on hand when the doors were thrown open Monday afternoon. It is evident even to a cursory observer that the spirit of this great display this year is not a commercial one—and in this respect the 1918 foundry and machine exhibition is unique. In previous years the shows at Boston, Cleveland, Atlantic City, Chicago, Buffalo, Pittsburgh and Detroit, to go back in order to 1910, were held primarily to promote the sale of foundry and shop equipment, in other words for strictly business purposes. To be sure, each of these exhibitions exerted a powerful educational influence, but primarily their purpose was commercial.

This year the spirit of the foundry and machine exhibition is one of service—service first to industry and through it to the nation in its great struggle for freedom and humanity. The underlying purpose of the show now in progress is to help and to educate and not to sell. The commercial aim is incidental. There are about two hundred separate exhibits on the two floors of the Milwaukee auditorium, and nearly every one of these contains some piece of equipment, some machine or some product that can be employed to speed-up the production of much needed war materials and save manpower for the army and for essential industries.

There is a change also in the character of the attendance. Fewer people than ever are present for purely sightseeing purposes, or for recreation and sociability. Nearly every man who passes the gates has come with the definite purpose of finding out what the exhibition holds for him which he can apply in a practical manner to the solution of his own war problems. In brief, the Milwaukee show is a great national war-service exhibition and a forum of incalculable value in the present industrial emergency.

Recruit More Engineers

THE man at the throttle is now Mr. Jones. Familiarity exemplified in the undignified, not to say condescending, title of "Casey Jones" no longer may be tolerated as applied to the personage who drives the engine or pulls the bell cord of the cannon ball express. Exalted to the dignity of a sizable income tax, hedged about by rulings which prescribe ample time for leisure and recreation, presented with the country's token of esteem carried in several months back pay, the railroader today holds an enviable position. Boyish ambition fired by the glamour of railroad life will possess an added incentive, and labor to operate the railways should not be lacking in the next decade. The same condition exists throughout other lines of skilled labor, but in no single branch of industrial activity is the exaltation of labor better illustrated than in railroading.

The boy just finishing high school finds no attraction in the prospect of four years of college training. Present high wages for labor dim the luster of professional life, and the salaried worker is an object of pity if not contempt. Except for the wise decision of the war department to place those draft registrants who are qualified in colleges for technical training along with their preparation for military service, it is extremely doubtful if classes could have been maintained in engineering colleges this fall.

The war is demanding engineering talent, mechanical, chemical, civil and electrical, and in time it will take toll, as it has in all the nations of Europe, from the best of the profession. Industrial service grappling with the problems of decreasing manpower is engaging engineering genius. After-the-war organization and reconstruction will require an increasing number of engineers. These

demads for technically trained men cannot be met alone by the training of 18 and 19-year old registrants in the draft. Engineering is a profession in everything except remuneration at the present time. To secure that devotion to vocation, without which no professional man is fully successful, places a burden of responsibility upon those who are now engaged in the practice of engineering. Suitable cash return for the time expended in preparation should be secured in order that the monetary basis may be sufficiently attractive to interest the boy who is choosing his life work. Recognition should be insisted upon in public and industrial work in which engineers bear so great a share. Mutual respect and co-operation among engineers even though engaged in competitive work should aid in establishing this public recognition. Summed up the task is simply one of advertising. The engineers of the present should so advertise their profession that it may bring forward a sufficient number to supply the market with engineers for the next generation.

Importance of Blast Furnace Gas

RAPID strides are being made by engineers in this country in recovering potash. In the foreground of this new enterprise stands America's cement plants where many tons of potash are being extracted from the kiln gases. How long the cement industry will continue to be the chief producer of by-product potash is a matter of conjecture. Already blast furnaces are looming up as a strong competitor and before long may become one of our important sources of potash reclamation. A 200-ton blast furnace smelts as much potash-bearing materials in 24 hours as a 3000-barrel cement plant in the same length of time. Upon investigating a few ores mined in Alabama, it was found that they contain from 0.15 to 3 per cent of potash.

When 51 per cent of these ores together with 36 per cent coke and 13 per cent dolomite composed the burden on a 200-ton furnace, the total potash content per ton of iron was 35 pounds. Estimating that 25 pounds are lost in the slag, there would remain 10 pounds per ton of iron available for recovery from the gases. With the present price of potash near $6 per unit, the by-product would bring $48,000, which is an exceedingly low estimate. What would the potash yield on a 500-ton furnace amount to figured in dollars? It is a matter not to be scoffed at and will bear close scrutiny.

It is said England is now recovering nearly as much potash from blast-furnace gas as was imported from Germany before the war and that before long will not have to depend on outside sources for her supply. The same might be said of America if our blast furnaces would consider the importance of potash recovery. Blast-furnace gas has to be cleaned of dust-bearing materials if it is to be burned efficiently. Why not make the proceeds derived from the sale of potash pay for the purification of the gas?

Many blast-furnace superintendents have lowered their operating costs considerably in the past few years. The recovery of potash opens another avenue for cost reduction not in mills per ton of iron but in cents. When the process of sintering flue dust was advocated, few furnace managers realized that such a large saving would be effected. Yet this is just what happened. Hot-blast stoves, automatic charging devices, gas washers, slag crushers—all these also brought about a decrease in operating costs. A potash by-product will do the same. It remains to be seen whether or not American blast furnacemen will take advantage of the opportunity offered by way of recovery plants and thereby break another of Germany's economic weapons which she intends to wield after the war.

Iron Trade Review on War Basis

IN conformity with the government regulations requiring a sharp curtailment in the consumption of paper, publication matter in THE IRON TRADE REVIEW in general, dating from this issue, is being set in 8-point solid type instead of 8-point leaded as formerly. This will effect a material saving of space and consequently of paper. Although the number of pages will be somewhat reduced, the amount of matter actually published will be the same, if not greater, than under the previous method. The government conservation program requires that there shall be a 10 per cent reduction in the amount of paper used in the year dating from July 1, 1917, to July 1, 1918. Owing to the rapid growth of THE IRON TRADE REVIEW, it has been found that a closer trim to the edges, the use of lighter weight paper, and the employment of several other expedients would be insufficient to produce the desired saving. These economies, however, will be carried out as well as those derived from the greater condensation of the reading pages.

THE IRON TRADE REVIEW cheerfully and gladly makes these necessary alterations of its established style, as its performance of the duty imposed by war upon business enterprises generally, to conserve labor and fuel. It feels certain that its readers will accept this announcement in the same spirit with which it is made. The changes now put into effect, are for the period of the war. The readers of THE IRON TRADE REVIEW may rest assured that there will be no deterioration of quality or reduction of quantity in the publication service which they have been accustomed to receive each week.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 874

PIG IRON

Bessemer, valley	$35.20
Bessemer, Pittsburgh	36.60
Basic, Pittsburgh	34.40
Basic, eastern Pa.	36.60
Basic, Buffalo	33.00
Malleable, Pittsburgh	35.90
Malleable, Chicago	34.50
Malleable, Buffalo	34.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern), $34 furnace base.

2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern), base plus $1.25.

2.75 to 3.25 silicon (No. IX), base plus $3.00.

Over 3.25 silicon, $37.00, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	40.60
No. 2 foundry, Pittsburgh	35.40
No. 2 foundry, Cleveland	34.00
No. 2 foundry, Ironton	34.00
No. 1 foundry, Chicago	35.25
No. 2 foundry, Chicago	34.00
No. 2X foundry, Phila.	38.85
No. 2X foundry, N. J. tide	39.05
No. 2X foundry, Buffalo	35.25
No. 2 plain, Philadelphia	37.60
No. 2 plain, N. J. tide	37.80
No. 2 southern, Birmingham	35.25
No. 2 southern, Cincinnati	38.85
No. 2 southern, Chicago	40.25
No 2 southern, Phila.	41.85
No. 2 southern, Cleveland	40.25
No. 2 southern, Boston	42.75
No. 2 southern, St. Louis	39.50
Virginia, No. 2X, furnace	37.50 to 38.50
Virginia, No. 2X, Phila.	41.85
Virginia, No. 2X, Jersey City	42.75
Virginia, No. 2X, Boston	42.95
Gray Forge, Pittsburgh	34.40
Silveries, 8 per cent, furnace	47.50
Silveries, 8 per cent, Chicago	51.50
Low phos. standard, Phila.	57.00
Low phos. Lebanon, furnace	51.00 to 53.00
Low phos. Pittsburgh standard	54.40
Charcoal, Superior, Chicago	38.70 to 39.00
Charcoal, Superior, Buffalo	38.50
Charcoal, southern to 2 per cent silicon	51.00

COKE

(At the ovens)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Pocahontas furnace	8.00
Pocahontas foundry	8.00
New River foundry	8.00
New River furnace	8.00
Wise county furnace	7.25
Wise county foundry	8.25

FERROALLOYS

Ferromanganese, 70 per cent delivered	250.00
Spiegel, 16 per cent fur., spot	75.00
Spiegel, contracts, furnace	75.00
Ferrocarbon, titanium, carloads, maker's plant	200.00
Ferrosilicon, 50 per cent, spot and contract, delivered	152.50 to 165.00
Bessemer ferrosilicon, 10 per cent	57.00
Bessemer ferrosilicon, 11 per cent	60.30
Bessemer ferrosilicon, 12 per cent	63.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O.

SEMIFINISHED MATERIAL

BILLETS AND BLOOMS

Open-hearth, Pittsburgh	$47.50
Open-hearth, Philadelphia	51.30
Open-hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forging, Pittsburgh	60.00
Forging, Philadelphia	63.80

SHEET BARS

Open-hearth, Pittsburgh	$51.00
Open-hearth Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

SLABS

Pittsburgh and Youngstown	$50.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.50
Grooved skelp, Pittsburgh	2.90c
Sheared skelp, Pittsburgh	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts.	3.00c
Structural shapes, Phila.	3.23c
Structural shapes, N. Y.	3.245c
Structural shapes, Chgo.	3.27c
Tank plates, Chicago	3.52c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.48c
Tank plates, New York	3.495c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	3.17c
Bars, soft steel, New York	3.145c
Bars, soft steel, Phila.	3.13c
Bar iron, Phila.	3.73c
Bar iron, Chicago	3.50c
Bar iron, Cleveland	3.67c
Bar iron, New York	3.745c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$55.00
Stand. open-hearth rails, mill	57.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	60.00 to 67.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	5.115c
Tie plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pittsburgh	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	5.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, 1 in. proof coil, Pitts.	7.50c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

(In cents per pound)

SHEET MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open-hearth, Chi.	5.27c

TIN MILL BLACK

No. 28, open-hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open-hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open-hearth, Chi.	6.52c

BLUE ANNEALED

No. 10, open-hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open-hearth, Chi.	4.52c
No. 10, open-hearth, Phila.	4.48c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base, Pittsburgh	Black Per cent off	Galv. Per cent off
¾ to 3 in., butt, steel	51	37½
¾ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

Without War Freight Tax

(Class B Pipe)

Class A pipe is $1 higher than Class B.

Four-inch, Chicago	69.80
Six-inch and over, Chicago	66.80
Four-inch, New York	70.70
Six-inch and over, N. Y.	67.70
Four-inch, Birmingham	63.90
Six-inch and over, Birmingham	60.90

HOOPS, BANDS, SHAFTING

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	3.50c
Hot rolled strip steel, Pitts.	3.50c
Hot rolled strip steel, Pitts. stamping quality	4.00c
Shafting, Pitts., carloads	17 off to list
Cotton ties, Oct., per bundle	$1.96

RIVETS

Structural rivets, Pittsburgh	4.40c
Boiler rivets, Pittsburgh	4.50c
Rivets 7/16 in. and small., Pitts.	50 and 10 off

NUTS AND BOLTS

(Prices f. o. b. Pittsburgh)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50-5 off
Cut thread	40-10-5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50-10-5 off
Cut thread	50-5 off
Larger and longer	40-10 off
Cold pressed semifinished hexagon nuts ⅝ in. and larger	60-10-10 off
Cold pressed semifinished hexagon nuts ⅝ in. and smaller	70-5 off
Gimlet and cone point lag screws	50-10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago)

Quotation on leading products October 9, average for September, 1918, average for July, 1918, and average for October, 1917. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices Oct. 9, 1918	Average prices Sept. 1918	July 1918	Oct. 1917
Bessemer pig iron, Pittsburgh	$ 36.60	$36.60	$36.60	$37.25
Basic pig iron, Pittsburgh	34.40	33.40	33.40	33.95
*No. 2 Foundry pig iron, Pittsburgh	35.40	34.40	34.40	33.95
*No. 2 Foundry pig iron, Chicago	34.00	33.00	33.00	33.00
Lake Superior charcoal, Chicago	38.70	37.70	37.50	37.50
Malleable, valley	34.50	34.90	34.90	35.20
Malleable, Chicago	34.50	33.50	33.50	33.50
**Southern, No. 2, Birmingham	35.25	33.50	33.50	33.00
*Southern Ohio No. 2, Ironton	34.00	33.00	33.00	33.00
Basic, eastern Pa.	36.60	32.00	32.00	33.00
**No. 2X Virginia, furnace	36.75	33.50	33.50	33.50
**No. 2X foundry, Philadelphia	38.85	34.50	34.50	34.25
Ferromanganese, 70%, delivered	250.00	250.00	250.00	285.00
Bessemer billets, Pittsburgh	47.50	47.50	47.50	58.75
Bessemer sheet bars, Pittsburgh	51.00	51.00	51.00	65.50
Open-hearth sheet bars, Pittsburgh	51.00	51.00	51.00	65.50
Open-hearth billets, Pittsburgh	47.50	47.50	47.50	58.75
Steel bars, Pittsburgh	2.90	2.90	2.90	2.90
Steel bars, Chicago	3.17	3.17	3.17	2.90
Iron bars, Philadelphia	3.73	3.73	3.73	4.935

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices Oct. 9, 1918	Average prices Sept. 1918	July 1918	Oct. 1917
Iron bars, Cleveland	$ 3.64	$ 3.64	$ 3.64	$ 4.50
Iron bars, Chicago mill	3.50	3.50	3.50	4.50
Beams, Chicago	3.27	3.27	3.27	3.00
Beams, Pittsburgh	3.00	3.00	3.00	3.00
Beams, Philadelphia	3.23	3.23	3.23	3.185
Tank plates, Pittsburgh	3.25	3.25	3.25	3.25
Tank plates, Chicago	3.52	3.52	3.52	3.25
Tank plates, Philadelphia	3.48	3.48	3.48	3.435
Sheets, blk., No. 28, Pittsburgh	5.00	5.00	5.00	7.75
Sheets, blue anld., No. 10, Pittsburgh	4.25	4.25	4.25	7.87
Sheets, galv., No. 28, Pittsburgh	6.25	6.25	6.25	8.81
Wire nails, Pittsburgh	3.50	3.50	3.50	3.87
Connellsville furnace coke	6.00	6.00	6.00	6.00
Connellsville foundry coke	7.00	7.00	7.00	6.00
Heavy melting steel, Pittsburgh	29.00	29.00	29.00	31.50
Heavy melting steel, eastern Pa.	28.50	28.50	28.50	26.00
Heavy melting steel, Chicago	29.00	29.00	29.00	27.00
No. 1 wrought, eastern Pa.	34.00	34.00	34.00	36.75
No. 1 wrought, Chicago	33.50	36.50	33.50	35.50
Rerolling rails, Chicago	34.00	34.00	34.00	36.00

(FOR ADDITIONAL PRICES SEE PAGE 874.)

Pig Iron Inquiry Gets Scant Notice

Furnaces Appear to be Delivering on 100 Per Cent Allocation and General Needs Call Forth no Response—Better Coke and Favorable Weather Are Helping Boost Furnace Output

Pittsburgh, Oct. 8.—A few inquiries are on the market for some sizeable tonnages of bessemer iron, but they might just as well have been withheld as far as there is any chance of their being booked. Not only is the number of furnaces engaged on this grade extremely limited, but makers uniformly incline to the unwritten dictum of Washington as to direct contracting. The Westinghouse Electric & Mfg. Co. seeks from 1000 to 3000 tons of bessemer iron for its Cleveland plant for shipment during the remainder of this year and into the first part of next year. The Mesta Machine Co. is reported to have put out an inquiry for 5000 tons, and the United Engineering & Foundry Co. also is understood to be looking for a good sized tonnage of bessemer iron. Not only is a deaf ear turned to these inquiries, but to all other bids for direct shipments. The Westinghouse inquiry is receiving less attention than the others, as it is believed here that since the iron is for Cleveland the tonnage should be secured there. Blast furnace interests note a further slight increase in iron production. Weather conditions are more favorable, but the big factor in the gain is the improved quality of the coke now coming to the furnaces. Some alarm however, is felt over the supply of coke, for as the quality has improved, the quantity has declined. Distribution of iron may be said to be close to 100 per cent on allocation.

Concentrate On Production

New York, Oct. 7.—Germany's peace proposal, Bulgaria's surrender and the advance on the west front, while causing general interest in the pig iron trade, are not even a slight factor in administrative and selling policies. Efforts are being redoubled to produce as much iron as possible to meet the government's war program. Allocations of foundry iron continue to be made in comparatively small tonnages, mostly for this year's delivery. There have been one or two instances of allocation of foundry iron for first half of 1919, but these have been for special government work and not for distribution to plants working on government orders. Several of the leading sellers continue to refrain from selling for first half delivery, being still in doubt as to how much tonnage they will carry over from this year.

Allocations Tone Down

Philadelphia, Oct. 8.—The pig iron situation in the East shows little change. Low phosphorus tonnage continues to be allocated regularly for next year, but a lull in 1919 basic allocations is noted and little foundry grades are being allocated for next year. Sellers are not booking much foundry iron for next year's delivery. In some quarters it is thought such a shortage of iron will prevail that all iron will be allocated in the first half year. Current allocations for this year are small lots. As previously reported, sellers now are quoting f.o.b. works instead of delivered to shift the payment of the war tax to consumers. This is an innovation for foundries. Pig iron production is showing general increase due to favorable weather conditions. Sickness is not yet a noticeable factor at furnaces. The Allan Wood Iron & Steel Co. will have completed blast furnace No. 3 at Swedeland by Nov. 1 and now together with the federal fuel administration is endeavoring to obtain supplies of coke and coal.

Allocations Total Large

Cleveland, Oct. 8.—Allocations of pig iron of all grades for government and essential purposes by the committee on pig iron, iron ore and lake transportation continue to increase rapidly. Since May 1 a total of 1,187,000 tons have been placed in this way. This includes 82,000 tons allocated during the week. The week's tonnage consists of 26,000 tons of low phosphorus, of which 22,000 tons are for first half of 1919 delivery; 23,000 tons of basic, 18,000 tons of malleable, 18,000 tons of foundry, 2300 tons of

bessemer and some scattered lots. New requests are continuing heavy.

Those received for the committee's attention within a day or two and now undergoing placement total 30,000 tons. Practically all iron being ordered by the furnaces in this territory at the present time is through the allocation route. Open market selling for 1919 delivery is of small volume.

Everything Through Allocations

Buffalo, Oct. 8.—Government requirements are increasing and there are no appreciable additions to furnace capacity to take care of this enlargement. Nothing is booked except through allocations and every ton is handled in this way. Malleable iron is very scarce and the demand far exceeds the supply. The malleable situation is unsettled and this is being reflected in the market. Allocations are coming along steadily and fair tonnages are being distributed to furnaces in this district right along.

Much for Shell Making

Chicago, Oct. 8.—Extension of shell making activity to Illinois and Wisconsin has created an enlarged demand for pig iron to be converted into semisteel shells and at present this is the biggest demand in the market. The Kohler Co., Kohler, Wis., was in the market recently for a large tonnage, in excess of 50,000 tons, to cover its requirements for its program of munition making. Part of this has been covered, the Wisconsin Steel Co. having sold 10,000 tons of bessemer for this purpose, for delivery over about six months.

The Western Malleable Co., Beaver Dam, Wis., is in the market for 10,000 tons of malleable iron, which it is understood has not be placed. Other inquiries for shell manufacture are coming out as new government contracts are made.

Returns of questionnaires on September consumption of pig iron are much better than for August. The effect of applying the rule of no shipments the month following failure to respond with these figures has had a happy effect. Those who failed on the August report early in September were the first in with September figures this month.

It is understood the American Radiator Co. is about to begin manufacture of shells at its plant at Kansas City and for this will require additional pig iron. Consignment iron from the south is moving better than a fortnight ago and is being placed carefully by sellers, most essential users being given first opportunity to buy, and an effort is made each time to place it with some contract holder, to apply on regular shipments.

Selling by regular dealers is not active, though consumers are contracting for first half of 1919 to some extent. Assimilation of the new schedule of prices and the new basing points has been prompt and little difficulty is experienced in adjustment. Prices under the new plan are well understood now, and prices do not assume the importance that formerly attached to that feature of buying.

Production is at a high rate but allocation of iron in addition to regular contracts has overloaded furnace books and deliveries are far behind schedule. Occasional instances are known of time lost from lack of iron, but this has been avoided in most cases and practically all melters have been given sufficient iron to operate.

Expect More Production

Cincinnati, Oct. 7.—Information as to the formation of an organization known as the Southern Ohio Pig Iron association was only received here this week. The first meeting was held at Portsmouth. The organization is intended to increase production in every way possible. The advance allowed will undoubtedly help in increasing production. Even working at the full limit, however, in the opinion of some well-informed furnace representatives, nothing can be devised to fill the demand at the present time. A few sales of odd lots of off iron have been made within the past few days, but no contracting is reported from any quarter.

Adjusted To New Basis

St. Louis, Oct. 5.—Adjustment to the new pig iron prices and arrangements is being rapidly accomplished in this district and as a whole things are being accepted with less complaint and dislocation than at first expected. The truth is needs are so urgent that so long as iron is forthcoming consumers are satisfied and not disposed to protest against cost or method of distribution. It is quite certain, however, that should the present scheme endure, revolutionary changes must take place in foundry practice and the general scheme of supply in this region. Southern producers are apprehensive relative to the outcome when normal conditions are restored. Customers of years standing are being forced elsewhere for iron, and some are doubtful if the old status will ever be completely restored. Specifically the market has undergone little change during the past week. Deliveries are in the main very satisfactory, and there have been a few sales of foundry for delivery into the first half to war material producers. Inquiries from nonessential users have gradually subsided. Selling agencies and producers are doing little aside from forwarding tonnages allocated by the government. One east side plant working on a heavy order for plates has asked for 3000 additional tons of basic for November-December delivery. The scarcity of foundry iron is as acute as that of steel-making grades, but with the blowing in of several old southern stacks, is expected to restore the equilibrium before the end of this month.

Orders Are Piling Up

Birmingham, Ala., Oct. 8.—Indications point to a steady piling up of orders for pig iron in the southern territory and already the belief is expressed that a large proportion of the probable output of iron for the first half of the coming year has been sold. Government instructions as to iron movements come in almost daily. Very little iron is being sold these days through the regular channels even though consumers are working on essential products. Some delivery of old orders still is being made. These orders were booked before the government control became so pronounced. Expectation of improvement in production now is expressed less confidently. In the Birmingham district, no sooner is one furnace blown in than another is put out for repairs. Unsteadiness in raw material, as well as fuel, is noted in this district. Despite consistent efforts being given constantly, production does not take on the pace that is desired. Inquiries are numerous yet but not receiving much attention here.

Further Shading

Reported On Manganese Alloys—Ferrovanadium Prices Higher

New York, Oct. 7.—The entire manganese alloy situation seems easy, including both ferromanganese and spiegeleisen. Further reports are heard regarding the shading of the $3.50 unitage on 70 per cent manganese. Spiegeleisen containing 30 to 40 per cent manganese is reported to have been shaded on several occasions, for next year's delivery, but the price of 16 to 18 per cent is holding steady at $75 furnace. Inquiry remains light.

Fifty per cent ferrosilicon is reported to have sold at Pittsburgh for next year's delivery at $147.50. This is considerably under the generally quoted market, a large part of first half requirements having been already filled at prices ranging from $150 to $155.

The market for ferrotungsten still is strengthening. A lot of 72 per cent ferrotungsten recently sold at $2.65, furnace. Makers generally are holding at $2.60 to $2.70. Alloy containing 80 per cent tungsten is commanding prices around $2.80.

Increasing tension is evident in the market for ferrovanadium. Sales of small lots have brought remarkably high prices. One small lot of low grade alloy, containing about 21 per cent vanadium and about 0.52 per cent carbon, was sold at $9 a pound. Sales of 30 to 35 per cent ferrovanadium have brought prices ranging all the way from $7 to $11 a pound. The large lots of 40 per cent ferrovanadium, recently sold by the alien property custodian at Philadelphia, brought about $6 a pound, as previously reported.

Interest in ferromolybdenum is showing some revival. The government appears to be specifying the use of this alloy in some of its special steels. Sales are being made at around $3.50 to $4 a pound contained.

Alloy Prices Soften

Philadelphia, Oct. 8.—Reports continue to be heard of shading of ferromanganese and spiegeleisen prices, but definite information still is lacking. Sellers claim there must be some shading because they have lost so much business while quoting maximum prices. The Griffin Wheel Co., Chicago, is reported to have just closed for about 2000 tons of spiegel, but further details are not known. It now is rumored that the recently noted Machinery Steel and Upson Nut orders went on a straight $3.50 unitage basis, equal to about $245

per ton on 70 per cent material. Prices for first half year delivery seem holding up fairly even with the market for the remainder of this year. Fifty per cent ferrosilicon prices also are easier, some sellers offering spot alloy at $155, delivered, and quoting deliveries over the last two months at $150. Sales for first half are reported recently at $147.50. Ten to 20 per cent bessemer ferrosilicon is scarce and strong, some sales of 20 per cent being reported at around $100 to $110, f.o.b. shipping point, for delivery this year.

Some Softness Shown

Chicago, Oct. 8.—Some softness in the market for ferromanganese and spiegeleisen continues and it is believed sales have been made at a price below the prevailing level, though this has not been definitely established. This condition applies especially to the lower percentages. Selling for first half delivery is being done in fair volume, but buyers are not anxious to cover fully at this time.

Business Almost Stagnant

Pittsburgh, Oct. 8.—Both as regards sales and inquiries, the market here for ferroalloys is almost at a standstill. Sales of 16 per cent spiegeleisen occur with fair regularity at $75, furnace, either on spot or contract, but only limited tonnages are involved. Almost nothing is doing in 70 per cent ferromanganese and there have been no additions to the recent inquiries for ferrosilicon. The Page Steel & Wire Co. has revised its inquiry and now seeks only 200 tons of 50 per cent ferrosilicon and 250 tons of 70 per cent ferromanganese delivery to be made over the remainder of this year and the first quarter of 1919.

Gear Men in Washington, Plan Ways to Help

Washington, Oct. 8.—The war service committee representing the gear manufacturers of the nation conferred Monday with members of the conservation section of the war industries board, pledging co-operation with the government in any measure considered necessary by the board. F. W. Sinram, Van Dorn & Dutton Co., Cleveland, president of the American Gear Manufacturers' association, informed the representatives of the section that the gear manufacturers are working to standardize their operations and aiming to conserve material and increase production. Good results have already been accomplished, but the gear manufacturers, he said, are more than willing to follow the suggestions of the government for general industrial efficiency. The discussion was of a preliminary nature and there probably will be further conferences. The committee was appointed at the request of the chamber of commerce of the United States and the personnel is the same as recently published in THE IRON TRADE REVIEW, with the exception that Mr. Harvey, Keystone, Hindley Gear Co., Philadelphia, was chosen in place of T. G. Meacham, New Process Gear Corp., Syracuse, N. Y., who was unable to serve.

Coke Showing Disappoints

Shipments for Past Two Weeks Show Decline in Face of Favorable Operating Conditions—Attributed to Labor

Pittsburgh, Oct. 8.—Shipments of coke from the Connellsville region for two weeks running have shown a decline and in view of the crying need of a large output and the efforts to the fuel administration to bring about this result, much disappointment is felt among consumers here. A drive is on in the region this week, however, for a combined output of 800,000 tons of coal and coke and at least some recovery from the recent recession confidently is expected. That there has been a decrease in the supply in the face of ample car supplies and excellent weather conditions leaves only one explanation and that is that labor is not proving as efficient as could be desired. Although shipments of by-product coal for steam purposes and of steam coal for coking is prohibited by the fuel administration, there still are some cases this rule is not adhered to. A case is cited where the government recently allocated 25,000 tons of coal claimed to be of coking quality to an Atlantic naval training station, where its use could have been for no other purpose than heating. It is claimed that some of this coal was turned down at destination and the shippers not only lost the tonnage for coking, but also had to stand heavy demurrage charges which piled up between time of arrival and reassignment. The eighth, ninth and tenth batteries of the Clairton by-product coke plant of the Carnegie Steel Co. still wait for supplies of coal to be blown in. Seven full batteries of this plant of 64 ovens each are in operation. Production of coke in the Connellsville region for the week ended Sept. 28, amounted to 335,195 tons, as compared with 339,475 tons in the previous week, according to the *Connellsville Courier*.

Production Still Lags

Birmingham, Ala., Oct. 8.—Coal and coke production in Alabama still lags. Some explanations point to labor, others to the transportation facilities and still others to the general situation. The federal fuel administrator representative of this district reported an output of 383,067 tons of coal for the wek ending Sept. 28 against 383,142 tons for the week ending Sept. 21. The production of coal in Alabama during the month of September was only 1,544,769 tons. Employes of mines are being urged to get out clean coal and a bonus is being given convicts working in mines to produce the best fuel possible. Efforts are being given to improve both the quantity and quality at coke ovens in this state. Railroad administration officials claim to be furnishing equipment sufficient for mine operations, but statistics on coal production have not been as encouraging as they might be.

Unstable Labor Is Factor

Cincinnati, Oct. 7.—The improved supply of coal is aiding operations in the Connellsville district. The labor supply is reported as not satisfactory because of the inefficiency of common labor now employed to help out the more experienced workmen. Loading coke, which does not require the use of trained labor, is somewhat retarded by the constant shifting of workmen. It was believed that this condition would be materially relieved by the last draft law but reports now given out seem to indicate that common labor is migrating to the munition plants. This is not the case in all districts and it remains to be seen what the final result will be. More stringent regulations have been the means of promoting production in all fields and also in the more prompt movement of the fuel. A number of furnace and foundry operators have been able, to secure enough coke to carry them through any sudden emergency, but three or four weeks is about the average length of time that either could operate if shipments were shut off.

Quality Slightly Improves

St. Louis, Oct. 5.—Aside from some further contracting for the first half of 1919, there has been little activity in coke here. Essential plants are doing well in the matter of supplies, having all they can use for current needs but there has been notably little in the way of accumulation. A further slight improvement in quality of eastern shipments is reported but there is still left much to be desired in this respect. Complaints made to the ovens are answered by passing the blame on the coal producers, who in turn seek cover behind the labor market, so that furnaces finding goodly quantities of slate and other foreign ingredients in their coke get little satisfaction when they kick.

Steel Industry Faces New Freight Increase

Youngstown, O., Oct. 7.—An increase in freight rates affecting the steel industry generally is indicated by the announcement of federal director of railroads putting in effect Nov. 1 a sharp advance in rates from Youngstown. On car load business after this month the rate to New York will be 32 cents per hundred instead of 23.5 cents as at present. Rates are advanced to all other points as well but the complete tariff schedule has not been received here, although the single rate quoted is said to be typical of the others. It is believed here that this change indicates an intention of making the steel industry wipe out any deficits the railroads of the country may encounter as a result of increases in operating costs.

Some months ago a new rate shot the tariff on steel in car load lots from 18.9 cents to 23.5, thereby making the latest increase 70 per cent over the former rate.

Scrap Lack Fades Quickly

Unexpected Offerings Pour Out at St. Louis and Weaken Market—Somewhat Similar Conditions at Cleveland—Other Markets Tight

FOR COMPLETE SCRAP PRICES SEE PAGE 874.

St. Louis, Oct. 5.—The market for scrap iron and steel took a rather sudden and unexpected turn here this week. With virtually no warning the scarcity which has existed for the past two months or more disappeared overnight, and dealers bobbed up with large tonnages for sale. Heavy purchases were reported by several of the larger interests, all from the yardmen and smaller dealers who recently were supposed to have nothing whatever to offer. One buyer's orders early in the week aggregated between 4000 and 5000 tons, mainly of iron, and relatively liberal acquisitions were made by other houses. Surprisingly large tonnages of steel also were sold, though a canvass of the field less than two weeks ago disclosed almost no holdings of any grade of steel in second hands. With the heavier offerings came a decided softening in prices. While actual quotations have not changed radically, it is understood that the recent busines was at rather sharp concessions in price. Several explanations are given for the change in sentiment. One is that the surrender of Bulgaria and ultra-optimistic war news served to frighten holders. Another is a report that the government has in mind to round up accumulated stocks in all positions and force them on the market. The most probable reason, however, is to be found in the withdrawal of a leading foundry interest from the market. This corporation for many weeks has been a heavy buyer, in fact almost an open purchaser for everything offered. Its unexpected withdrawal from the market caused a considerable stir among the selling element. The supposition immediately arises that other big consumers may also stop buying. St. Louis is an extremely sensitive scrap market. This is because this district under normal conditions produces more scrap than it can use. There were no railroad offerings before the market this week. All classes of buyers are displaying more caution, many of them refusing to pay commissions. The decline on rolling mill and foundry grades is as much as $1 a ton. Some short selling by dealers has taken place this week.

Shortage More Pronounced

New York, Oct. 7.—Increasing scarcity of all grades continues to be the outstanding development in the New York scrap market. This shortage, which is becoming more marked throughout the east, is reflected particularly at this time by the suspension of operations at some of the eastern Pennsylvania blast furnaces. In addition to this growing scarcity of material, the unimproved situation with regard to labor is causing dealers considerable difficulty. Permits for buying clean cast iron boring and turnings at $21 continue to be issued to various rolling mills by the subcommittee on iron and steel scrap. Prices are all firm at the maximum set by the government.

Only a Limited Turnover

Pittsburgh, Oct. 8.—Only a limited turnover of scrap iron and steel, is possible dealers report, owing to their inability to pick up tonnages of any account. The demand is heavy and consumers readily would take on much more than they are getting, even though they now are receiving direct from the railroads much of the better grades and also benefit from the close governmental distribution of steel mill supplies. The business in short is passing from the dealers' hands to the scrap subcommittee of the American Iron and Steel institute. This committee, however, is making strong efforts to help out where real shortages exist. While the demand for an extension of the embargo on the shipments of turnings to the blast furnaces has been refused, it is understood that the committee has expressed a willingness to permit open-hearth interests to secure supplies by allowing the payment of differentials or some other such means. Meanwhile, it is said that permission to pay more than $19 for turnings is to be denied blast furnaces, except possibly those making low phosphorus iron. Heavy cast scrap is extremely scarce, and about the only recent business in this grade was an exchange deal where the buyer took a tonnage at $29, delivered, plus commission and turned over a tonnage of another grade. A sale also is noted of 2000 tons of cast borings; this came from a western point, the buyer paying the differential in addition to $19 and in commission. The Pennsylvania lines cast in offering 41,964 gross tons of scrap which have been on sale at the shops during the past four months adopts a new method for its disposal. Instead of asking bids, it accompanies the offering with a letter asking buyers as to the advantage of making an agreement or contract with them, the terms of which would be at the maximum fixed prices agreed.

Cheaper Grades Climb

Buffalo, Oct. 8.—The market is strong on all grades of scrap, and there has been such a general demand that the cheaper classifications have climbed to a level with the better stock. It is felt in some quarters that further criticism of action taken by the subcommittee of the American Iron and Steel institute in increasing the price of turnings is unwarranted. The criticism comes chiefly from dealers. Numerous infractions of government rulings have been brought to notice from time to time and some dealers in view of the fact that no serious damage has resulted from them, are becoming bolder in their disregard of the subcommittee's rulings.

Market Is Weaker

Cleveland, Oct. 8.—There is further evidence that scrap iron and steel scarcity is not as bad in certain districts at least, as it has been pictured. One large consumer, asked to take an equal amount of malleable along with heavy melting steel, refused a fair-sized tonnage of the latter, scarce as it is. No prices have been marked down, but the general tone of the market is much weaker. The steady buying that consumers have had under way for the past four or five months is showing results in larger stockpiles. Peace talk is having some effect too, and some dealers are purposely keeping trading at a low ebb. Reports of government maximums being exceeded are frequent, but lack substantiating evidence. Turnings continue to demand the full government maximum of $19. Melting steel, too, can be disposed of without any trouble.

Situation More Acute

Chicago, Oct. 8.—Since scrap yards have found it impossible to obtain oxygen and acetylene for use in cutting up boilers and tanks, a condition has arisen which promises to render a heavy tonnage of this class of material unavailable. Most yards still have some supply of gases for use in cutting torches, but in a short time will be entirely out. With labor scarcity, it will be impossible to reduce boilers and tanks to a condition where they can be used for scrap and unless a change is made in the ruling as to gas, this class of material will begin to accumulate in yards. Most scrap dealers and consumers expect to see the present shortage increase during the winter and as few consumers have a reserve, the situation promises some interesting developments. The Chicago, Milwaukee & St. Paul offers 43 old locomotives on their own wheels; the Burlington 2000 tons, the Santa Fe 1300 tons, the Wabash 1150 tons and the Northern Pacific 450 tons.

Seeking Substitutes For Iron

Cincinnati, Oct. 7.—There is no change in the scrap situation, as reported by different dealers. All grades are in constant demand. Grades that can be substituted for pig iron are especially wanted. The supply is just about holding up to the demand, but if any urgent call should come for any grade in quantity there might be some difficulty in filling the order. This does not mean that yard stocks are close to exhaustion. Any kind of scrap that may be used by a stovemaker is acceptable.

Taking Situation Quietly

Birmingham, Ala., Oct. 8.—Filling orders on hand as best they can, holding out on some grades for a better price and making effort to overcome labor shortage in handling material in yards, the dealers of scrap in the south are taking in the situation calmly. While considerable scrap is reported under purchase, there appears to be some trouble in getting it to the yards. Labor is very scarce in the yards. Consider-

able business continues under way but the dealers claim that they have not been making any particular effort for additional sales.

Turnings Situation Moderates

Philadelphia, Oct. 8.—It is stated at the office of the scrap subcommittee that the special permit granted to five bar iron mills to pay $21 for turnings expired Sept. 28 and the embargo on shipments to blast furnaces expired Sept. 21. Consequently the turnings situation now is as formerly with no discrimination as to shipments. However, it is learned in other quarters that some business still is being done in turnings at $21, possibly on permits obtained prior to Sept. 28. The scrap situation still is tight on all grades except low phosphorus at $36.50, which seems fairly plentiful. No shading of maximum prices is reported.

Big Lots

Of Barbed Wire Remain In Market—Nail Price Dissatisfies

Pittsburgh, Oct. 8.—Allocation of the big tonnage of military barbed wire, amounting to 150,000 tons or more, still is hanging fire and while distribution will be made, makers in this district have not yet been notified of their allotments. Cutting off of steel for rods limits the activities of the wire mills to a point where production is sufficient only for government needs. Nothing except the requirements of the government is being turned out. No barbed wire is available for regular commercial uses and nails rapidly are working into this category, while the output of fencing and screening is working off to the vanishing point in the attempt to speed up on the lines wanted for military use. Jobbers' orders are getting less and less attention.

Barb Tonnage Pending

New York, Oct. 7.—Since the recent allocation of about 65,000 tons of barb wire for overseas shipment, there have been no large wire awards. No action yet has been taken on the 100,000 tons of painted, black and galvanized barb wire previously reported as under negotiation. Several thousand kegs of nails a week continue to be allocated for the improvements and extensions to cantonments, but this business is dwindling. The rebuilding of the Morgan, N. J., shell loading plant, badly damaged by explosions last week, will require around 4000 to 5000 kegs, it is estimated. The revision of wire nail prices is not altogether satisfactory, especially to Texas and Pacific coast makers, who protest that the freight allowance, which is made per 100 pounds, should have been made to include the keg also, a keg of nails weighing 108 pounds, or, in the case of wire, should be made to cover the spool.

Jobbers' Stocks Gone

Buffalo, Oct. 8.—Jobbers report stocks practically stripped on all kinds of wire. The government is said to be far behind its schedule in barbed wire requirements. No change in price has yet been made, though the war industries board has it under consideration.

Sulphur Limit is Raised

Because of Poorer Grade Coal, Users Asked to Accept .06 Carbon Steels—Commericial Semifinished Scant

Cleveland, Oct. 8.—Inferior quality of coal and coke which the steel works recently have been forced to use, is reflected in the movement which leading producers have undertaken to raise the sulphur limits in all carbon steels from 0.05 to 0.06 per cent. It is explained that this has been brought about by the fact that not more than 10 per cent of the coal being used today is of the low sulphur variety. This is because it is said under government regulations the bottoms of the seam where the sulphur content is highest must be mined as against the former practice of leaving it untouched. Most of the consumers of steel, appreciating the situation, have been willing to accept the modification of the sulphur specifications, but others have been showing some opposition. The forging trade especially has been affected in an important way by the change. Alloy steels are not subject to the modification. The demand for alloy steels continues extremely heavy and tonnage is scarce. In some cases carbon steel is being substituted for alloy steel for springs. A new order for naval guns placed in this district will require 6000 tons of alloy steel. A pending order for 25,000 3-ton trucks for the army will call for about 22,000 tons of similar quality material.

Big Requirements In Sight

New York, Oct. 7.—The damage by explosion to the shell loading plant of T. A. Gillespie & Co., Morgan, N. J., while serious in a property sense will in no way interfere with shipments of shells abroad. Government officials stated that the plant's production amounted to about 10 per cent of the total current output and other plants are being speeded up to make up the loss. Considerable amounts of shells were exploded, but this loss is insignificant in comparison with the current production of about 100,000 tons of shell steel daily. Next year's munition production is regarded as stupendous. It is said that 150,000,000 3-inch shells alone are on the program, this being the largest single item, due partly to the extensive use of this size as gas shells. However, the quantities of shells ranging all the way from one pounders to 18-inch shells, require every ounce of steel that can possibly be spared from the shipbuilding and railroad programs. No large steel steel allocations have been reported the past week.

Out of Commercial Class

Pittsburgh, Oct. 8.—Billets, sheet bars and wire rods no longer can be considered as commercial commodities, for such a large percentage of the ingots, either are going direct to the rail or slab mills that the output of other semifinished steel of necessity is curtailed. Small tonnages of billets occasionally are made available through the mistakes by some who are just starting in the production of shell rounds, but such tonnages find an outlet without coming upon the open market. Production of sheet bars has been hard hit by the government effort to secure more steel for the prime war requirements. Sheet and tin plate mills find their allotments none too great. Shutting off of steel supplies has brought down drawing of wire rods to less than 50 per cent of capacity and there are government orders for finished material to absorb fully the limited rod production.

Output Still Limited

Pittsburgh, Oct. 8.—Output of cold rolled strip steel still is curtailed by the lack of steel. Mill operations are barely 50 per cent of capacity and production is about sufficient to meet essential needs. It seems to be the plan of the government to see that no more steel goes to the mills turning out what are rated as the less essential products that is called for by the high priority orders. Production of hot rolled strip steel also is limited and enough government orders are on the books of the various companies to take care of the present scale of output for two to three months.

Southern Ohio Iron and Coke Men Organize

Following two preliminary meetings the Southern Ohio Pig Iron and Coke association was formally organized at a meeting in Portsmouth, on Thursday, Sept. 26, 1918. The object of this association is "The discussion of all problems entering into the manufacture of pig iron and coke, and any improvement or standardization which shall add to the quality and quantity of both products," as set out in the by-laws adopted, and its merbership is made up of individuals, consisting of executive officers and men in charge of and interested in the operation of blast furnaces and coke oven plants in the Ashland, Ironton, Hanging Rock, Portsmouth, Columbus, Hamilton, Wellston and Jackson districts.

The officers selected to serve for the following year are: R. H. Sweetzer, the American Rolling Mill Co., Columbus works, president; S. G. Gilfillan, president Belfont Iron Works Co., Ironton, O., first vice president; Chas. R. Peebles, Ashland Iron & Mining Co., Ashland, Ky., second vice president; W. R. Knapp, Portsmouth Solvay Coke Co., Portsmouth, O., third vice president; S. E. Stephenson, Wellston Iron Furnace Co., Wellston, O., fourth vice president; R. S. Brunner, Hamilton-Otto Coke Co., Hamilton, O., fifth vice president, and H. H. Briscoe, Eaton, Rhodes & Co., Ashland, Ky., secretary-treasurer. The officers constitute an executive committee, which will have supervision of the association's activities at all times.

All Farm Steel Not Cut

Larger Makers of Implement Sections, Excepting Certain Specialties Form Concessions—Raise Question Over Contracts

Chicago, Oct. 8.—Various industries using steel bars, as well as other finished steel products, have been given notice of the proportion of former needs which they can buy at present. In the case of agricultural implement makers, this has been stated as 25 per cent less than former consumption. This action by the war industries board is lessening tonnage asked by various industries and to that degree is lightening the burden of steel mills. Buying by the government is at about the same rate as has prevailed recently. The leading interest here maintained a higher daily average production during September than in any other month this year. The fuel situation is slightly better and this is having its effect in production. Manufacturers of hard steel bars rerolled from rails find conditions growing steadily worse as to their raw material, railroads offering almost no old rails. Most replacement work now being done is confined to frogs and crossings, which do not yield rails for rerolling. Demand on the part of consumers is not as heavy as it has been, principally because buyers have found the impossibility of placing further tonnage. Bar iron users are not making contracts and most of their buying is of the spot variety. The present buying movement is not steady and business is likely to be bunched between periods of comparative quiet. Most mills are fairly well covered for the remainder of the present year but have not yet sold anything for first half delivery.

Iron Replaces Steel

Buffalo, Oct. 8.—Considerable bar iron was sold during September. The scarcity of steel bars is forcing users to substitute iron. It is understood that there is a scarcity of large rounds in hot rolled and cold-rolled, and consumers are finding it difficult to place any tonnage as mills are refusing them, because direct government orders absorb capacity. Some cold-finishing mills are operating 50 per cent of capacity because of inability to obtain sufficient hot-rolled stock.

Adjust to New Regulations

Cleveland, Oct. 8.—Automobile interests in this district have been adjusting their steel requirements to the regulations of the government that their production during the last quarter of the year shall be 25 per cent of their 1917 output, after which they shall go on a 100 per cent war basis. In some cases cancellation of tonnage which will not be called for under this program has been made. The price concession to the farming implement makers continues to be applied to consumers of this character in this territory. The adjustment in each case largely is dependent upon the individual circumstances. In some cases old tonnage placed before the new arrangement went into effect is being rewritten to the new basis which provides for its being taken out in the manufacturing season of from July 31, 1918, to June 1, 1919. Only such tonnage as will represent 75 per cent of the implement makers' requirements for last season is being accepted. War demands are causing the replacement of a great deal of tonnage on mill books in that consumers now receiving government orders are having these requirements entered on mill books as a substitute for an equivalent tonnage previously placed.

Shortage of Steel Felt

Pittsburgh, Oct. 8.—Shortage of steel, due to the diversion to other purposes, is being felt in the operations of the bar mills, few of which are running now at better than 50 per cent of capacity. Operations of a number of the mills rolling bars of small dimensions have been cut off entirely, in order that ample supplies of steel might be provided those engaged on steel for shells. There is no commercial supply of steel bars, as the limited tonnages being produced are needed on direct or indirect government work.

Bolt Needs Increase

Chicago, Oct. 8.—With heavy demand from all users of bolts and nuts producers now are faced with two fairly large inquiries from the government which run to a million or more bolts. Construction work at the Neville island gun plant promises to bring a large inquiry from that source. Most manufacturers are unable to accommodate inquiry now active and much business is being turned away.

Operating About 50 Per Cent

Pittsburgh, Oct. 8.—Just about 50 per cent of mill capacity is engaged on cold rolled shafting and practically the entire output is being applied against essential orders. The situation in the smaller sizes is a shade easier with regard to supplies as a result of the cutting off of the demands of the pleasure automobile industry. An outlet for this surplus, however, is being found in war work and wants of commercial users are getting no more attention than formerly. The larger diameters are scarce, current output being just about sufficient to take care of high priority orders.

Supply and Demand About Equal

Pittsburgh, Oct. 8.—Only a limited demand exists for hoops and bands but production is materially curtailed by the steel shortage and between standing orders and government needs, output is being pretty well absorbed.

Labor and Steel Short

Pittsburgh, Oct. 8.—Makers of nuts, bolts and rivets are engaged practically 100 per cent on essential orders, but are not getting sufficient supplies of steel to run anywhere nearly 100 per cent capacity and are falling behind to some extent in their deliveries. Labor also is a factor in production. New labor seems unobtainable and some trouble is reported in maintaining even the present organizations. New government allocations are reported to be coming out frequently, but details are not made public.

Cut Sheet Output

Bars Grow More Difficult to Get—Mills Slow Down

Youngstown, O., Oct. 9.—A few makers in this district are of the opinion that before long few sheets of any kind will be made here. Steel is becoming scarcer each month, and right now several makers have not enough bars to run at 50 per cent capacity. Few mills have ever attained the 75 per cent production mark as requested by the government sometime ago, due to a shortage of steel, and indications are that the shortage is becoming more prevalent. Makers feel that shells and plates are more necessary to the prosecution of the war than sheets and hence they consider that the sheet industry will suffer reverses for a while, probably being classed as a nonessential. The government's requirements as far as valley mills are concerned, have been coming in lighter each week. This has led some makers here to believe that government needs have been taken care of. If this is the case expectations are that a damper will be placed on the sheet business for a while so that more steel may be diverted into the making of plates and shells. If such a curtailment in bars should come, makers do not expect any general notification from the government. They are rather of the opinion that conditions on the battle front will automatically bring about a curtailment of sheet bars. The pressure for shell steel is tightening to such an extent that at present few ingots are available for converting into sheet bars. Domestic inquiry is not as brisk as it has been the past two months. Buyers evidently realize few sheets are to be had in the valley and that the scarcity is becoming more pronounced each week. Priorities, unless they are of the class A rating, are of no account as far as some makers are concerned for nothing but class A sheets are being rolled. Some makers have notified the government that so long as their mills are supplied with orders bearing a class A priority, business with a lower rating will not be solicited or considered. Those who have followed this course are booked approximately a month ahead. However, even mills working on government business continue to lag because of sheet-bar scarcity.

Sheet Bar Shortage Felt

Pittsburgh, Oct. 8.—Operations of the sheet mills continue at an extremely low rate, due entirely to the shortage of sheet bars. Government or essential business never was heavier than now, but seemingly authorities look on this business as not especially pressing, or believe the steel can be put to a better use for the

time being. The bars, at any rate, are not available and not only are the mills falling behind in their deliveries on essential orders, but the jobbers for the present might just as well have no orders booked, for under the circumstances they can get no attention.

Jobbers Orders

In Pipe Are Being Cut—Cast Pipe Plants In Uncertainty

Pittsburgh, Oct. 8.—Jobbers evidently made big shipments of steel pipe to direct and indirect government work, as their October replacement orders are heavy. But in view of the effort to save steel for the vitally essential war needs, the mills will from now on get decreasing allotments and one result of the enforced curtailment will be that jobbers' orders will be cut. The leading interest still is running about 75 per cent of capacity, but this is explained by the fact that virtually 100 per cent of its business carry high priorities. A lower rate of operations also is in store for the makers of cast iron pipe, but wrought iron manufacturers probably will escape any restriction of their activities. The move on the part of the war industries board is to economize on the better grades of foundry iron and on steel. Manufacture of wrought iron pipe, since it takes gray forge or a low-grade foundry iron, in no way interferes with the ends that are sought. In fact, it is understood that some good sized tonnages of wrought iron pipe have been allocated among makers to take the place of steel pipe. Current output of this kind of pipe is more than 95 per cent on high priority orders.

To Deal Through Government

New York, Oct. 7.—The possibilty that many cast iron pipe markers will have to suspend operations entirely in the near future was intimated at the meeting last week in Washington between manufacturers and the finished products division of the war industries board. The action is being considered by the board in the interest of further conservation of pig iron, but in any event will be taken only as a final expedient. No definite statement was made at the meeting as to how such a plan might be carried out, and manufacturers consequently are very much at sea. One step likely to be taken shortly is the instigation of a ruling whereby all governmental departments, as well as private interests engaged in war work, will place their cast iron pipe requirements before the war industries board, instead of dealing direct with the manufacturer. Trading in the east is featureless.

Akron Asks Prices

Chicago, Oct. 8.—In a period when inquiry for cast iron pipe on the part of municipalities is almost unheard of, one unusually large lot is now pending. The city of Akron, O., having disposed of an issue of bonds, has asked bids for Oct. 18 on 5750 tons of 30 to 48-inch. It is not known whether the city has obtained a certificate of necessity, which is preliminary to a contract at this time.

Grip Knocks Plate Output

Some Works in East Have Been Forced to Slow Down as Workmen Are Laid Up

Philadelphia, Oct. 8.—The ravages of an epidemic of Spanish influenza, grip and colds constitute a serious factor in works production. It is reported plants in the Chester and Eddystone district, including the Baldwin Locomotive Works, are short 50 per cent of workmen. One plate mill's production dropped to one-third last week; it had been operating at over 95 per cent. Some others show a reduction of 25 per cent in workmen. The Hog Island ship plant is short about 10 to 15 per cent of workmen. It is reported Worth Bros. Co., at Clayton, Dela., will close down temporarily. There are said to be 200,000 cases of influenza in Philadelphia, and strict measures are being taken to fight the epidemic. Office forces are badly depleted and much work is being held up. Plate mills are also watching their pig iron and coal supplies closely. These mills buying these materials are using them from hand to mouth and are unable to accumulate stocks for the winter.

Production Is Heavy

Pittsburgh, Oct. 8.—Production of the plate mills continues to reflect the diversion of steel from less essential purposes. For the month of September the Carnegie Steel Co. reports rollings of 120,279 tons of universal and sheared plates, a showing that has been surpassed only in three other months. These were March, May and July of this year and were months of 31 days each, as compared with 30 days last month. The total output for August was 111,539 tons. This means a gain for September of about 9000 tons, or close to 12 per cent. The 110-inch Liberty mill of the company produced 19,145 tons, against 17,626 tons in August. Distribution of tonnages is 100 per cent to essential work, with the shipbuilders getting large amounts, either direct from the mills or through the fabricating shops. Standardization of ship plates continues to get much attention, because of the desire to speed up shipbuilding. Fabricating capacity entirely is on essential work and such plants are getting liberal tonnages of plates. The car companies also enjoy high preference in the matter of supplies.

Ship Material Leads

Chicago, Oct. 8.—Some of the tonnage of ship plates which was being held back by the government is now being placed. About 80,000 tons for one shipbuilder is understood to have been placed with a western mill recently. Other tonnage of a similar nature has been allocated but all in small lots. It is understood that several large tonnages remain to be allocated, but the policy of the government at present is to give out new tonnage only when there is a possibility of delivery being made within a reasonable period. The former policy of throwing everything into the hands of manufacturers without regard to possibility of delivery is being modified materially. Under absolute government control, the business can be handled much better by having regard for possibility of delivery before placing heavy tonnages.

Steel Saving

In Tin Plate Now Subject of Conferences at Washington

Pittsburgh, Oct. 8.—Washington is the center of interest just now of the tin plate manufacturers, as conferences are being held there daily between the war industries board and the various users of tin containers. The object of the meetings is to determine where a saving can be made in the supply of steel, for as regards the tin supply, the situation now is quite comfortable. It is expected that some announcement will be forthcoming with the conclusion of these hearings, but just what it will contain can be only conjectured at present. Meanwhile, the allotment of tin bars has been cut to a point where only 70 per cent of mill capacity can be employed. And as the requirements for perishable food crops practically have been satisfied, the fear is expressed that some difficulty may be experienced in keeping the plants up to a 70 per cent basis of operations with only a limited amount of government and food container business remaining to be satisfied.

Production Is Curtailed

Youngstown, O., Oct. 9.—Tin plate production at the plant of the Liberty Steel Co., Warren, O., has been curtailed until Jan. 1, to 70 per cent of capacity in accordance with government request. During the next three months a large tonnage of sheet bars which the company has in stock will be converted into black plates. Another mill will be installed which will give the company nine units.

Production of tin plate at this plant has increased steadily since the eight mills have been in operation. In August the output was 40,000 base boxes and it is stated last month's production will approximate 45,000 base boxes. No difficulty has been experienced in obtaining either a supply of pig tin or sheet bars as the entire output of tin plate has gone into government work.

After the war should trade conditions warrant, the Liberty company will erect a sheet mill and steel plant. Between Warren and Leavittsburg where the tin mills are located, the company owns 100 acres. Above Leavittsburg on both sides of the Mahoning river, it owns 500 acres.

The Canton Sheet Steel Co., Canton, O., is now completing two 90-ton open hearth furnaces, one of which will be put in operation within two weeks.

Will Place Many Trucks

Builders Asked to Bid on 25,000 3-Ton Requiring 50,000 to 75,000 Tons of Steel—War Structural Orders Prevail

Cleveland, Oct. 8.—From 50,000 to 75,000 tons of structural material will be required for a new order for 25,000 trucks about to be placed by the war department which has been brought to the attention of builders in this district. These trucks are of the 3-ton class B type and delivery is wanted in the period of from Dec. 1, 1918 to June 1, 1919. In view of the filled-up condition of the truck plants in this district, there is some question whether these builders will be able to get out their quota within the required time.

Dullness Grows in East

New York, Oct. 8.—Aside from a few relatively insignificant tonnages, commercial demand in the eastern structural market is at a virtual standstill. The dullness, thus resulting, is further accentuated by the steady decline in the general run of miscellaneous government business. Fabricators now are forced to rely almost entirely upon demands from the railroads and the Emergency Fleet corporation, particularly the latter. Practically the only business of interest to eastern fabricators to be awarded within the past few days, is a contract involving about 1000 tons for a new machine shop at the Mare Island navy yard which went to the Pittsburgh-Des Moines Steel Co. An item of about 6000 tons for the proposed structural shop at this yard still is pending.

Full on Government Work

Pittsburgh, Oct. 8.—Capacity of fabricating mills is engaged in full with essential government work and there is no room for private business even were it offered. Restrictions on private construction relieve fabricators from any demands of consequence from this source. It is the part of the shape manufacturers to look out for the needs of the Emergency Fleet corporation and essential war work construction these days and they are giving these demands their entire attention. No new structural lettings, which must come from the government and carry high preference ratings to get attention, have come out lately. Government building plans, especially in the case of the Neville island gun plant are carefully guarded.

Government Only Buyer

Chicago, Oct. 8.—Three lots of structural steel have been closed recently in the west, all going to government purposes. Aside from these nothing of sufficient size to be important has been closed. The largest lot involves 1100 tons for a machine and heat treating shop at St. Louis. A machine shop at Mare island takes 992 tons. Lines are being drawn continuously tighter on sales of structural material and no work is allowed to proceed which is not thoroughly essential.

Good Supplies for Yards

Philadelphia, Oct. 8.—Structural mills still are operating on A priority material, making only occasional shipments of material not meeting specifications to B and C consumers. The war industries board is going over mill reports carefully to ascertain whether some steel shipped under the head of other government work might be conserved; but as such shipments all are covered by priority certificates or affidavits, little has been gained in this way. Shipyards' winter requirements gradually are being provided. Within two months, it is believed, all structurals needed for the present program will be stocked in yards or shipped from mills to fabricators. Admiral Bowles is credited with saying the Hog Island plant has 310,000 tons of plates, or enough for 170 ships either in the yards or shipped from mills. The Submarine Boat Co., it is understood, is figuring on 50 additional ships.

CONTRACTS AWARDED

Steel for machine and heat treating shop for the United States government, St. Louis, 1100 tons, to Christopher & Simpson, St. Louis.

Machine shop for the bureau of yards and docks, United States government, at Mare Island, Cal., 992 tons, to Des Moines Bridge & Iron Co.

Miscellaneous steel work for Ninety-fifth street subway, Chicago, for the Illinois Central railroad, United States Railroad administration, 290 tons, to American Bridge Co.

Manufacturing plant addition for Wilputte Coke Oven Corp., Chicago, 250 tons to the Worden-Allen Co., Milwaukee.

Calcium Carbide plant for Gas Tank Recharging Co., Milwaukee, at Keokuk, Ia., 110 tons, to Worden-Allen Co., Milwaukee.

CONTRACTS PENDING

Constructing any one or all of three buildings for the National Analine and Chemical Co., Buffalo, 750 tons.

Many Rails

Wanted By French Government—Speed Up Output of Mills

Chicago, Oct. 8.—The Republic of France is inquiring for 135,000 tons of standard steel rails. Inasmuch as most American mills have contracts for more than they can roll in the next year, it is difficult to see where this business can be placed, unless it is given preference over demands of roads in the United States. Railway needs have become so pressing in the past few weeks that the government has recognized the need for rails and track fastenings and has ordered mills to divert a certain portion of steel from plates and shell bars for the production of rails. Of first importance in rails is the 200,000 tons ordered for use by the military railroad in France, which are being furnished as fast as they can be laid. Other production is being diverted to domestic railroads. Production in the west has been put to about 80,000 tons per month, where 65,000 tons per month had been the maximum previously. This does not represent much more than half the mill capacity if sufficient steel could be provided.

Further allocations have been made of steel necessary for construction of military cars for use in France. The entire needs for this purpose have not yet been placed.

Big Locomotive Order Placed

New York, Oct. 7.—Outstanding in the eastern railroad market during the past week, is the award of 500 locomotives to the Baldwin Locomotive Works. These locomotives will be for use of the American expeditionary forces in France. The order aggregates $20,000,000, and will be handled at the new plant of the Baldwin company at Eddystone, Pa. According to an official statement deliveries will be made early next year at the rate of 50 locomotives a week.

Rush Rails to Pershing

Philadelphia, Oct. 8.—Car builders were called to Washington this week in connection with new orders for 40,000 freight cars for overseas to be let in about a week. This business is aside from about 100,000 cars which are expected to come up for the railroad administration. It also is rumored about 300 additional locomotives will be awarded as it is expected the current order for 500 will be completed about Jan. 1. It now is understood the rail mills are rolling about 50,000 to 55,000 tons of rails weekly for General Pershing's forces. This large tonnage is needed as the allied advance proceeds because extension of communications to the front lines absorbs large amounts of rails. It is believed the current Pershing rail orders will keep the mills busy well up to the close of this year, and mills have many months' work for domestic roads. Probably more than 2,000,000 tons are backed up on mill books.

No Important Transactions

Pittsburgh, Oct. 8.—No important contracts have been placed lately in spikes or rails. The hurried call for rails from General Pershing having been met, there has been a considerable slowing down in the operations of the mills that were engaged. No agreement having been reached on prices, the placing of the orders for rails for the roads under governmental direction still is held up. It is hinted in some quarters that some of the railroads still have contracts made at relatively low prices and for that reason the railroad administration balks at paying current prices of $57 for open-hearth and $55 for bessemer rails. Makers of light rails are rather heavily committed and are not making sufficient headway on these orders to be much inclined toward accepting further business. A strong demand exists for small spikes, but the raw material is not plenty enough to permit of anything like full acceptance of the business offered.

Portable Tracks Placed

Cleveland, Oct. 8.—Additional orders for 150 miles of portable track for delivery abroad have been placed with manufacturers in this district. About 6000 tons of rails have been called for which will be furnished by Chicago makers. Some lots of portable track also are pending for the United States government.

New Regulations for Exporting Steel

War Industries and Trade Boards Adjust Slight Differences and Prescribe Just How Export Licenses, Etc. May be Put Through—Definite Details Afford Real Working Basis to Exporters

WASHINGTON, Oct. 8.—The war industries and war trade boards finally have settled their differences over regulating the production of steel for export and in a joint statement today announced the procedure with respect to export licenses, priority certificates and permits of the director of steel supply for the exportation of iron and stel products. This statement supersedes paragraph No. 6 of the joint statement of July 3 issued by J. Leonard Replogle, director of steel supply, and Edwin B. Baker, priorities commissioner, the war industries board withdrawing the paragraph.

At the time the joint letter of Messrs. Replogle and Parker was issued, it became known the paragraph had offended the war trade board, but officials in both boards declined to discuss it, some even going so far as to deny there was any difference over the point. The war trade board felt the war industries board had gone too far in trying to tell when to seek export licenses and in the statement today the trade board appears to be the victor. However, the points intended to be covered by the war industries board in the statement July 3 appear to have been won, but in another way.

The joint announcement today gives all steel on the war trade board's export conservation list an automatic classification of C when the steel is intended for export. As the mills today, however, are paying little if any attention to Class C orders, some even refusing production of Class B material because of heavy tonnages covered by higher ratings, Class A and Class AA, provision is made in the new steel export regulations for higher classification being made. The classification will be made and the license issued from a single application by the exporter.

The new regulations are regarded as highly important to the steel trade and government officials ask careful study and attention be paid them. The regulations cover articles on schedule "XP" of the war trade board which take in pig iron, ferrosilicon, spiegeleisen, iron and steel scrap, ingots, billets, blooms, slabs, sheet bars, skelp, wire rods, alloy steel, high steel, tool steel, bars (including flats 6 inches wide and narrower), hoops and bands (including hot and cold rolled strip steel), shapes (including beams, angles, channels, tees and zees), fabricated structural steel (including beams, angles, channels, tees, zees or plates ¼ of an inch thick or heavier), plates (all classes, ¼ of an inch thick and heavier and wider than 6 inches, and circles over 6 inches in diameter. This includes No. 11 U. S. gage but not No. 11 B. W. gage), sheets (all classes, under ⅛ of an inch thick), boiler tubes, mechanical tubes, boring tubes, oil well casing, line pipe, drive pipe, cast iron pipe, wrought iron and steel pipe, poles, wire rope (cable and strand consisting of 6 wires or more), rails and splice bars, frogs and switches, railroad tie plates, railroad track spikes, railroad track bolts, boat spikes, wire, wire nails, wire spikes and cut nails. The joint statement in full is as follows:

1. The war industries board and the war trade board announce, in a new ruling (W. T. B. R. 258), that they have jointly adopted the following rules and regulations for the purpose of simplifying the procedure of obtaining export licenses from the war trade board, priority certificates from the priorities committee of the war industries board, and permits from the director of steel supply of the war industries board.

2. The war industries board announce the withdrawal of its regulations as set forth in P. C. form No. 18, July 3, 1918, paragraph 6, requesting that applications for licenses to export iron or iron and steel products should not be filed with the war trade board unless the orders are covered by either priority certificates or permits from the director of steel supply.

3. On and after Oct. 14, 1918, applications for licenses to export any article on schedule "XP", annexed hereto, should be filed with the war trade board, and must include the following papers properly executed:
(a) One application form X, to which should be attached
(b) One each of such supplemental information sheets as may be required by the rules and regulations of the war trade board to be used in connection with shipments of certain commodities and shipments to certain countries, and
(c) New supplemental information sheet, form X-26, which will be ready for distribution by the war trade board on and after Oct. 14, 1918.

4. Applications which have form X-26 attached will not require form X-2.

5. The priorities committee of the war industries board has awarded priority classification "C" to all articles (on which priorities are issued) which are on the export conservation list of the war trade board and are covered by export licenses issued on and after Oct. 16, 1918. No class "C" certificates will be issued with such licenses. If the article specified on the licenses is one on which priorities are issued, and if no individual priority certificate accompanies the export license, the license itself will be evidence that the articles covered by it have been automatically awarded priority classification "C."

6. Export licenses issued on and after Oct. 16, 1918, under these regulations, covering commodities on which priority certificates are issued, will be accompanied by individual priority certificates of the priorities committee when in the opinion of the priorities committee a higher rating than class "D" is warranted. These priority certificates will be issued by the priorities committee and forwarded with the export license without further request from the applicant.

7. Export licenses issued on and after Oct. 16, 1918, for the exportation of iron and steel, or the products or manufactures thereof, which are not covered by priority classification, will in themselves constitute a permit and approval from the director of steel supply for the filling of the orders for the quantity of iron or steel specified in such export licenses to the extent that such delivery will not interfere with the delivery when and as required by orders covered by priority.

8. It is the policy of the war industries board and the war trade board to discourage and prevent exporters and manufacturers from purchasing, manufacturing or producing articles on the export conservation list for the fulfilment of specific export orders until an appropriate export license has been issued. Instances have come to the attention of the war trade board in which manufacturers before obtaining export licenses have manufactured articles for specific export orders which articles while useless for domestic consumption could not under the regulations of the war trade board be exported. It is essential for the proper conservation of commodities in the United States that this practice be stopped, and it is the purpose of the war trade board to refuse licenses to exporters who do not conform to this policy.

9. The priorities committee announces that it undertakes where necessary to administer priority in the production of all raw materials and finished products save foods, feeds and fuel. The preference list promulgated by the priorities board forms the basis for the distribution of fuel. Priority is being administered generally on iron and steel products, copper and brass products, electrical equipment and the products on which any of the above form an integral part. Priority is not being administered at this time on lumber or lumber products, paper or paper products, chemicals, brick, cement, lime, hides, pig tin, tin plate, mine products and numerous other items which cannot well be enumerated. It is not possible to prepare lists in detail covering either priorities or nonpriorities products and even in those mentioned above exceptions will from time to time occur. Any inquiries with respect to the commodities upon which priority is being administered should be addressed to the priorities committee of the war industries board.

Milwaukee Greets Metals Congress

Wisconsin City is Meeting Place for Hundreds of Leaders in Iron and Steel Industry as Foundrymen and Steel Section of Mining Engineers Open Annual Sessions—Program of Unusual Interest

MILWAUKEE, Oct. 8.—This city has temporarily become the center of the iron and steel industry, following the opening here today of the Allied Metals congress. This meeting is being held under the auspices of the American Foundrymen's association, the Institute of Metals division of the American Institute of Mining Engineers, the Iron and Steel section of the American Institute of Mining Engineers and the American Malleable Castings association. These organizations are holding simultaneous conventions here this week and close to two thousand visitors are expected to be attracted to this city.

A joint session was held this morning when the week's big program got under way. Later individual sessions were held by each of the various organizations, an arrangement that will be continued throughout the week to permit a closer study of problems of peculiar interest to each group.

An unusually complete program has been prepared, not only in the technical papers to be presented but in the features of more general interest. Motion pictures will have a prominent place in the proceedings. These will include views showing how soldiers are being trained, how crippled soldiers are being fitted for civil reestablishment and how concrete ships are built. Other films will be devoted to submarines and torpedoes in action, to the construction of the Hog Island shipyard, to the triplex process of making steel, to cause and prevention of industrial accidents and to gas and flame warfare.

The government has arranged an exhibit of ordnance which is unusually complete and which permits many of the visitors to see for the first time the assembled product for which they are making parts. This exhibit includes a field gun, machine guns, shells, hand grenades, rifle grenades and other missiles of warfare.

At the annual banquet on Thursday, Charles M. Schwab, director general of the Emergency Fleet corporation, will deliver an address, W. H. Blood, Jr., will present an illustrated talk on the Hog Island yard and Maj. A. Radclyffe Dugmore, a veteran of the war, will tell of his experiences.

Pledges Support to President

The opening session of the Allied Metals congress drew a most enthusiastic pledge of support in forcing Germany's unconditional surrender. The resolution, pledging the united support of the metal industries, was telegraphed to President Wilson.

C. S. Koch, of the ordnance department, Washington, presented a paper showing that this department is the greatest business organization in the history of the world. He urged manufacturers to discuss problems of operating details among themselves which method would speed up production and eliminate delays.

E. N. Hurley, chairman of the United States shipping board, in a letter urged closer study of merchant marine problems, and requested that the foundrymen form a permanent committee to study the subject.

E. D. Brighman, manager of the iron ore, coal and grain traffic for the federal railroad administration, predicted traffic conditions this winter will be greatly improved with iron ore and coal supplies sufficient for manufacturers and railroads. Lake traffic shows steady improvement in the tonnage carried over last year.

Maj. Frank B. Gillbreth, Providence, R. I., gave an illustrated lecture on the method of transferring skill by motion picture lessons. He showed the methods pursued by the government in training soldiers and urged the application of similar studies in industrial training.

Milwaukee's Quota Near

Approximately 70 per cent of the minimum quota of $33,000,000 allotted to the city and county of Milwaukee on the fourth Liberty loan already has been pledged. The state of Wisconsin already has raised more than half of its quota of $100,500,000. In city, county and state, the foundry and machine shop industry has contributed much to make the early part of the campaign successful.

The fourth Liberty loan drive for Wisconsin is under the general direction of E. J. Kearney, secretary and treasurer of the Kearney & Trecker Co., Milwaukee, maker of Milwaukee milling machines. The metal trades division of Milwaukee county is being directed by C. R. Messenger, vice president of the Chain Belt Co., who is assisted by B. Rosing, works manager, A. O. Smith Co.; Alfred Kieckhefer, National Enameling & Stamping Co., and J. F. Henry, Milwaukee Structural Steel Co.

Among the larger subscriptions already secured by Chairman Messenger are the following: Allis-Chalmers Mfg. Co., $600,000; the Falk Co., Kearney & Trecker Co., and A. O. Smith Co., $500,000 each; Ferdinand Schlesinger interests, $300,000; Harley-Davidson Motor Co., $200,000; Filer & Stowell Co., Cutler-Hammer Mfg Co., $150,000 each; and the Chain Belt Co., Kempsmith Mfg. Co., Pressed Steel Tank Co., Nordberg Mfg. Co., Pawling & Harnischfeger Co., Ford Motor Co., Milwaukee Corrugating Co., Globe Seamless Steel Tubes Co., $100,000 each.

Milwaukee hopes to reach $50,000,000, which will mean an over-subscription of 50 per cent. In the third loan campaign, the over-subscription was 55.4 per cent and interest in the fourth loan is even greater.

Barb Wire Price Changed

The following statement has been made by E. H. Gary, chairman of the committee on steel and steel products of the American Iron and Steel institute:

Referring to my statement under date of Sept. 26, 1918, it appears that the recommendation in respect of barbed wire was incomplete and the following correction should be made. Cancel the line reading:

Add for special weights or packing $0.15 and substitute therefore the following:

EXTRAS FOR PACKING

For spools 75 lbs. to 95 lbs.	$0.15
For spools 60 lbs. to 75 lbs.	0.20
For spools 50 lbs. to 60 lbs.	0.25
For spools 40 lbs. to 50 lbs.	0.40
For spools under 40 lbs.	0.65

Further announcement is made under warehouse prices:

"Add to announcement of Sept. 26:

"'Where materials are customarily shipped in standard containers of substantially uniform type, such as kegs, barrels, etc., freight to be added to carload mill price, f.o.b. Pittsburgh, may include freight on average weight on container as determined by custom and experience.'

"The table showing maximum selling prices from warehouse stock at various important points is intended merely to illustrate the principles on which resale prices would be calculated. Distributors should figure resale prices from the specific instruction given in regard to each item and disregard the table if it seems to conflict."

Engineer Now in Custody

Pittsburgh, Oct. 8.—H. L. Shreck, who has been chief engineer of the Mackintosh-Hemphill Co. for several years, was taken into custody on Monday afternoon by the federal authorities on the charge of failing to secure an enemy alien permit. It seems that Shreck, who has been in the United States for a good many years, has never taken out citizenship papers and although registered last December as an alien enemy, he carefully concealed this fact from his employers. The technical charge made in the warrant is said to be only part of the charge that the authorities have against Shreck, who was a member of the German club and is reported to have been actively engaged with C. F. Banning, now out on bail pending a hearing for alleged violation of the espionage act, in spreading pro-German propaganda. Shreck is said to have served as a member of the governor's troop, Pennsylvania national guard cavalry during the Spanish-American war.

September Breaks Pig Iron Records

Shows Largest Daily Output in History With 113,765 Tons Average—Total is Greatest for Any 30 Day Month—Month's Output is 3,412,955 Tons, Substantial Gain Over August

PIG iron production figures for the month of September indicate the effort being made by blast furnace operators to supply the government with a sufficient quantity of this commodity for the successful prosecution of the war. The coke and anthracite blast furnaces of the United States during that month produced 3,412,955 tons of pig iron, or at the rate of 113,765 tons daily, this being the highest average daily production ever recorded. As September is a short month, the total tonnage did not make a record, but it is the greatest total ever produced in a 30-day month. October is always an exceedingly favorable month for blast furnace operations and if the furnaces can continue at the rate shown in the past 30 days, the tonnage for the current month will be far in excess of the record made in October, 1917.

MONTHLY PRODUCTION

	1918	1917	1916
January	2,403,227	3,159,839	3,171,878
February ...	2,318,242	2,649,935	3,078,548
March	3,209,996	3,255,813	3,327,630
April	3,273,355	3,328,061	3,225,496
May	3,451,884	3,413,677	3,364,584
June	3,316,148	3,260,234	3,213,818
Total 1st half	17,972,852	19,067,559	19,381,954
July	3,408,584	3,337,442	3,221,127
August	3,378,479	3,238,970	3,197,838
September ...	3,412,955	3,140,742	3,208,041
Total 9 mos..	28,172,870	28,784,713	29,008,960
October	.....	3,296,286	3,508,180
November ...	.....	3,198,597	3,317,895
December ...	.....	2,885,380	3,184,178
Total 2d half	.....	19,097,417	19,637,169
Grand total	28,172,870	38,164,976	39,019,123

Shows Gain Over August

September pig iron production showed a gain of 34,476 tons over the August total of 3,378,479 tons. The nonmerchant of steelmaking furnaces produced 2,534,894 tons, compared with 2,505,618 tons in August, a gain of 29,276 tons. The output of the merchant stacks reached a total of 799,237 tons, or 4300 tons above the August figure of 794,937 tons. In daily average production, however, the gain is more noticeable, the September daily average of 113,765 tons being 4782 tons above the August daily average of 108,983 tons.

The daily average for the steelworks furnaces during September was 84,496 tons, compared with 80,826 tons in August, a gain of 3670 tons. The merchant furnaces gained 998 tons daily, their daily average for the month being 26,641, and for August, 25,643 tons.

Spiegel production which has been increasing very rapidly during the past few months, reached a total of 47,152 tons in September, or 5003 tons more than in August, when 42,149 tons were made. Ferro production showed a loss of 4103 tons, the figures for September and August being 31,672 and 35,775 tons, respectively.

Furnace Number Less

On the last day of September, 364 furnaces were in blast, a loss of seven, compared with Aug. 31, when 371 were on the active list. Four merchant stacks were blown in and nine were blown out, a net loss of five; while three steelworks stacks were lighted and five blown out, a net loss of two.

The Vanderbilt No. 1 furnace of the Woodward Iron Co. was blown out on Sept. 23 for relining and repairs.

The Leesport Iron Co., Leesport, Pa., is planning to blow in its Leesport stack by the end of October.

The Oxford, N. J. stack of the Empire Steel & Iron Co., Catasauqua, Pa., is being relined. It was blown out on Sept. 7.

It was found necessary to patch the lining of the Lorain No. 4 furnace, of the National Tube Co., Pittsburgh, and the furnace was idle for 17 days in September while the work was being done.

The new Indiana Harbor stack of the Steel & Tube Co. of America, So. Chicago, Ill., which was blown in on Aug. 26, produced its first tonnage of iron in September. While the stack was blown in in August, no good iron was made during that month.

On account of not being able to secure coke, the Texas Steel Co., Beaumont, Tex., has been forced to delay the blowing in of its blast furnace. The company has purchased coal lands in Alabama and is now mining coal from which it will produce sufficient coke to operate its furnaces. The Texas company now plans to light its furnace within 90 days.

AVERAGE DAILY PRODUCTION

	1918	1917	1916	1915	1914
Jan. ..	77,523	101,930	102,319	51,323	60,624
Feb. .	82,794	94,641	106,157	59,521	67,450
Mar.	103,548	105,026	107,343	66,009	75,534
Apr.	109,112	110,936	107,517	79,484	75,383
May	111,351	110,119	108,535	72,747	67,646
June	110,538	108,675	107,127	78,998	63,486
July	109,954	107,659	103,907	82,687	63,075
Aug.	108,983	104,483	103,156	89,510	64,403
Sept.	113,765	104,691	106,935	94,478	62,757
Oct.	.....	106,332	113,167	100,656	57,007
Nov.	.....	106,620	110,593	101,174	50,042
Dec.	.....	93,077	102,715	103,278	48,236
Avg.	103,197	104,562	106,610	81,022	62,934

SEPTEMBER PIG IRON

States	No. of stacks	No. in blast last day of month: Sept.	Aug.	Total tonnage made: Merchant	Nonmerchant	—Totals— Sept.	Aug.
Pennsylvania	161	142	142	235,551	1,087,092	1,322,643	1,283,005
Ohio	80	74	75	152,767	616,468	769,235	767,845
Alabama	45	30	34	111,830	95,515	207,345	213,189
Virginia	20	13	14	34,094	.....	34,094	33,790
New York	29	26	26	87,162	130,338	217,500	216,591
New Jersey	5	4	4	17,847	.....	17,847	15,822
Illinois	25	23	23	53,562	242,844	296,406	318,873
Colorado	6	4	4				
Indiana	16	15	14				
Maryland	4	4	4	33,881	296,713	330,594	322,477
Wisconsin	6	4	4				
Kentucky	7	4	5				
West Virginia	4	4	4				
Tennessee	17	10	10	40,128	40,259	80,287	80,907
Washington	1	0	1				
Georgia	2	0	0				
Texas	3	0	0				
Minnesota	3	3	3	32,415	25,665	58,080	48,056
Michigan	3	3	3				
Missouri	1	1	1				
Spiegel—all states						47,152	43,149
Ferro—all states						31,672	35,775
Totals	438	364	371	799,237	2,534,894	3,412,955	3,378,479

Reduced Tonnage

Shown By September Ore Shipments —Total Is 8,995,014 Tons

Shipments from upper lake ports for September, show a decrease as compared with those of September of last year. Where last year's shipments totaled 9,536,152 tons, this year's figures show 8,995,014 tons or a decrease of 541,138 tons. This is also a decrease when compared to the August, 1918, shipments, which amounted to 9,725,331 tons. The August shipments, in turn, were less than those of the two record months which preceded. The shipments for the season, nevertheless, are still in advance of those for the same period in 1917. The shipments to Oct. 1, 1917, amounted to 46,059,706 tons, or 2,269,572 tons less than the 1918 shipments of 48,329,278 tons.

The following table shows the amount of ore shipped from upper lake ports and the total shipments from each port up to Oct. 1.

	September 1918	To Oct. 1. 1918
Escanaba	1,025,741	5,037,222
Marquette	536,886	2,812,978
Ashland	1,096,686	5,679,195
Superior	1,978,984	11,176,917
Duluth	3,204,829	16,361,722
Two Harbors	1,151,888	7,261,244
Totals	8,995,014	48,329,278
1918 decrease	541,138	
1918 increase		2,269,572

Eight Hour Day

Upheld in Appeal of Wheeling Mold Case—Steel Corporation Cited

Washington, Oct. 8.—The United States Steel Corp.'s establishment of a basic 8-hour day for its employes has been used by Walter Clark, chief justice of the supreme court of North Carolina, as part of his reason for denying the Wheeling Mold & Iron Co. a rehearing on the decision of the national war labor board on Sept. 16 when the board's award was made forbidding employment of any molder more than eight hours in any one day.

The department of justice today is to file in the Supreme Court of the United States motions for continuance of the Steel corporation, the American Can Co., and other antitrust cases until the next term of court.

Judge Clark's opinion in the Wheeling case, given as the umpire as provided by the war labor policy, in full is as follows:

This is a petition to rehear the decision of the board in this case, filed 16 September 1918. The chief ground urged is that the agreement passed upon had not been actually adopted by the parties.

It is true, it was a proposed agreement, but the argument on both sides presented the question whether the agreement, if adopted, would mean an actual 8-hour day, or a basic 8-hour day. If it was the former it was acceptable to the plaintiffs, the employes. If it meant the latter, it would be accepted by the defendant company and imposed upon the workers.

The case was thoroughly argued by both sides with great force and ability, and the points at issue were clearly understood by the board and the umpire. Upon hearing the case, the decision was that an actual 8-hour day should be adopted, and as a protection against overtime "on emergencies" it was ordered that nothing should be held an emergency unless so declared by three votes of a joint board to consist of two members to be selected by the employers and two by the employes.

On a full and careful review of the arguments then made and the questions presented by the petition to rehear, the opinion and the award heretofore made are in every respect confirmed.

Soon after this opinion and decision of the board had been rendered, and possibly, in consequence of it, the great United States Steel Corp., with 300,000 employes adopted the 8-hour law and other companies are doing the same. By reason of its position as a great financial and progressive institution, the action of the United States Steel Corp. marks a distinct advance toward the universal adoption of the 8-hour day, especially if there shall go with it the provision of the award in this case that there shall be no evasion of the "8-hour" day upon the declaration of the employer alone of emergency, but the emergency shall be declared by a majority of the joint board appointed by the employers and employes as stated in the award in this case.

Long since Henry Ford, another progressive and successful employer of large bodies of men, adopted voluntarily the 8-hour day, which is the end toward which industry is inevitably and irresistibly moving, by reason of it being justice to the employes and no less to the real interests of the employers and managers of our great industries.

Steel Rail Price Hangs Fire

Washington, Oct. 8.—The steel rail price still is hanging fire. Director McAdoo evidently has taken sides with John Skelton Williams for a cheaper rail. McAdoo would eliminate the high cost producer as the high price for rails would give the low cost manufacturer profits which he feels tax measures could not get back.

Did Not Understand Order

Washington, Oct. 8.—Official announcement is made today from the office of Director of Steel Replogle that the Fishel & Marks Co., Cleveland, doing a scrap iron and steel business, also warehousing raw materials in finished forms, has been found by the war industries board to have violated the pledge they had filed regarding the sale and distribution of their material. The company, insisting this violation was done through misunderstanding of instructions, has promised to guard against possible complaint in the future and as an evidence of good faith it has voluntarily donated $500 to the Red Cross.

The Non-Ferrous Metals

Copper Lead Spelter Tin

	*Copper	†Spot Straits, tin	‡Lead, New York basis	Spelter St. Louis basis	§Aluminum	Spot antimony
Oct. 2	26.00	.....	8.05	8.95	33.00	14.00
Oct. 3	26.00	.....	8.05	8.90	33.00	14.00
Oct. 4	26.00	.....	8.05	8.85	33.00	14.12½
Oct. 7	26.00	.....	8.05	8.70	33.00	14.12½
Oct. 8	26.00	.....	8.05	8.65	33.00	14.12½

*Government fixed maximum price for prime lake, electrolytic and casting copper, in ingots, pigs, slabs, etc., less than carloads, 27.30c.

†No spot Straits tin offering.

‡Price agreed to by leading interest and independents.

§Government fixed price for 98 to 99 per cent ingot aluminum in 50-ton lots; lots 15 to 50 tons, 33.10c; one to 15 tons, 33.20c.

NEW YORK, Oct. 8.—Probably the most momentous development in the history of the tin industry has been the movement to put this metal under the direct control of allied governments. The war industries board officially announced last week this decision to control the domestic pig tin situation by a license system whereby the United States Steel Products Co., subsidiary of the United States Steel Corp., will be the only company to be granted a license for pig tin, and further that the Steel Products Company will distribute tin to dealers and users as directed by the war industries board. The announcement also stated that the interallied tin executive will carry out the terms and agreements of the interallied pig tin pool recently arranged at London, will control the buying prices in each production market, while the war industries board will control prices and terms under which pig tin is to be sold to domestic users and dealers. Lastly, the announcement referred to the questionnaires now being distributed among the tin trade, stating that before the licenses are issued, the inventory of stocks on hand and contracts unfilled among 2000 odd individuals and plants effected will be completed, after which time if necessary there will be a redistribution of stocks on hand to equalize them according to essential uses.

This decision apparently completely removes the task of distributing tin to consumers in this country from the hands of various importing agencies, who heretofore have supplied their needs. Further, through concentration of buying power, the interallied pool will place its own prices on the output of tin in the various producing markets, even on Banca tin which is produced in the colonial district, a neutral country, Holland. All private importers apparently are eliminated from the domestic pig tin market for the reason that they will be unable to secure importing licenses from the war industries board. It is understood that the United States Steel Products Co. will finance the tin purchases in the producing markets. It was recently announced that American consumers would receive approximately two-thirds of the world's supplies, about 80,000 tons a year. As a result of the present fluxing situation, there is no buying of tin in the open market, and all prices on tin for shipment from abroad are nominal. Spot Banca tin for resale is quoted about 82c to 83c, New York.

In the absence of consumer's demand, the spelter market continues to weaken. In the past week, prices have declined ¼ to ½ cent a pound on prime western. Higher grades are holding firm. Larger sellers have been trying to steady the market, and have not been offering freely, but there have been sufficient offerings of small quantities to cause considerable pressure.

The copper situation is so well controlled that there is little change from week to week. Producers are scheduled for a conference with the war industries board Oct. 15 to consider prices for the period beginning Nov. 1. Probably the entire copper production now is being absorbed in government work.

The lead producers' committee has just sent out a questionnaire to consumers asking them to specify the amount of lead they have purchased during the three years, 1915, 1916 and 1917, and for what purpose this lead was bought. The lead situation is also fully controlled and there is little change to be noted. Prices remain 8.05c, New York, and 7.75c St. Louis.

The antimony market has become somewhat stronger with more buyers than sellers at the current prices of 14.12½c to 14.25c, duty paid, New York. Considerable antimony for future shipment has been sold at 13.12½c to 13.25c, c. i. f., New York in bond.

The aluminum situation is unchanged. Secondary aluminum interests met at Washington recently and formed an organization called the Secondary Aluminum Producers Association for War Services, which will assist in the conservation of aluminum.

Saving Man Power in the Foundry

To Permit the Foundry to Produce a Maximum Output it is Necessary for Machine Designers to Pay Close Attention to Molding Problems —Advantages of Machine Molding Are Explained

BY E. S. CARMAN

THE American people are just beginning to realize that they really never knew the correct definition of the word "saving." We, have been an extravagant people producing anything and everything to add to our comfort, and in the years gone by he was considered a genius who could create and produce, even at the most extravagant cost of labor and wealth, an article that would bring additional comforts to men; but we are today facing a new condition and he is considered a genius who can create and produce an article which will be the most destructive to man.

This business of war, in which the whole world is engaged, requires that every available man and woman be made to produce war materials with the greatest efficiency possible, and doubtless the war will be won by that group of nations which can produce the maximum with its available manpower. Therefore, we Americans have determined that every effort shall be put forth to obtain the maximum production per man in order to win the war. Progress in this line has been made in many industries; but the industry that most concerns us, as foundrymen and engineers, is that of the foundry.

Analyzing Foundry Operations

Let us make an analysis of the foundry and see whether or not we are getting the maximum production per man, and if not, let us place, if possible, the responsibility for not having obtained the maximum.

Foundry operations may be divided into classes as follows: Yard work, handling of pig iron, scrap, coke, flask equipment, etc.; sand handling; molding; melting and pouring iron; and shaking out and cleaning the castings.

FIG. 1—TUNNEL SEGMENT MOLD MADE ON MACHINE

In the specialty foundry, the foundry producing duplicate castings in large quantities, there has been a satisfactory advance in the saving of manpower per pound of output by the installation and use of yard cranes, motor-driven yard trucks, electric magnets, sand conveying systems, molding machines, pouring machines, shakeout machines, sand blasts, tumbling mills, etc. The best specialty foundries are equipped with practically all of the foregoing and are still looking for other means to reduce manpower by the use of money-power.

The Engineer's Part

The engineer has had his part in the design and production of all the equipment named in the foregoing paragraph, which efficiently performs the function required of it. There is, of course, opportunity for further development and improvement, but during the war, if such as we now have available is made use of by the foundry industry in general, a very great saving of manpower will result.

The engineer has performed his duty in regard to the design of the equipment for foundry use, but I wish to ask the question, "Has the engineer performed his duty in regard to the *product* that the foundries are turning out?" As the foundry output is castings only, I ask again, "Who, if not the engineer, is responsible for casting design? Who is responsible for the casting with a core so large and heavy that it cannot be supported by the available core print, and, if perchance it can be supported, what about removing the core after the mold is poured? And then again, who is responsible for all the fancy beads, extending lugs, recesses, sharp corners, joining thin and thick sections of metal and many other unnecessaries?" All of these retard production and in some instances prevent the use of machine molding, requiring instead the greatest manual skill to secure even a low production.

A paper presented at the annual meeting of the American Foundrymens' association held at Milwaukee, Oct. 7-11. The author E. S. Carman, is associated with the Cleveland Osborn Mfg. Co., Cleveland.

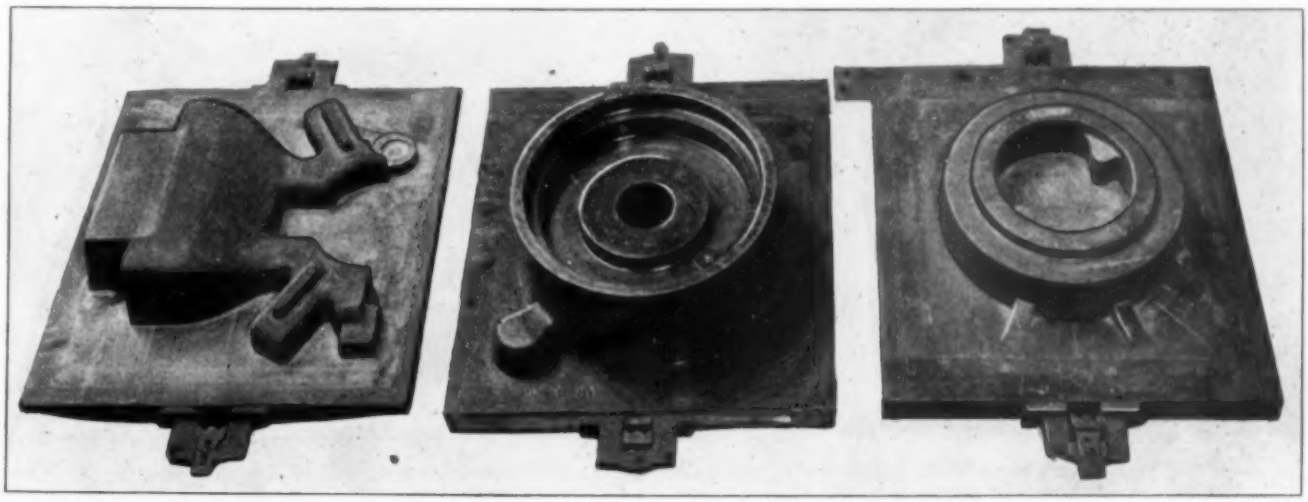
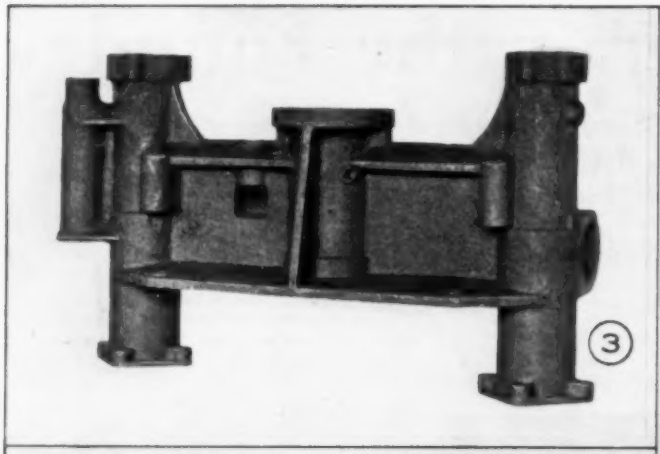
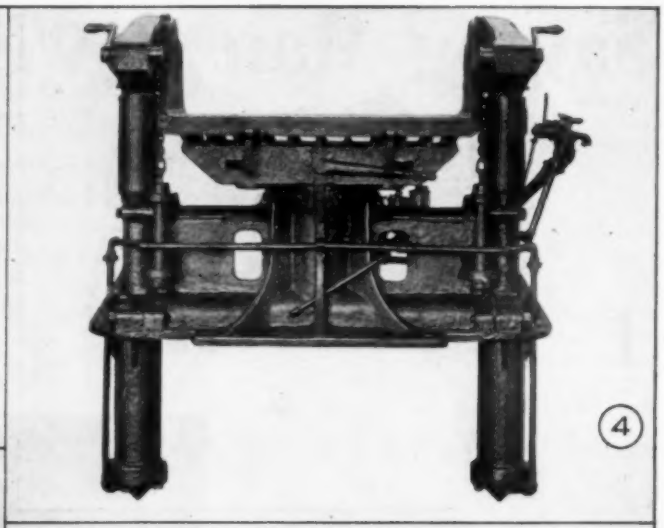
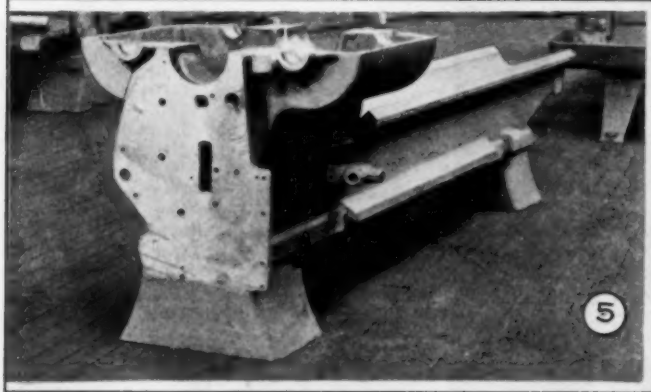
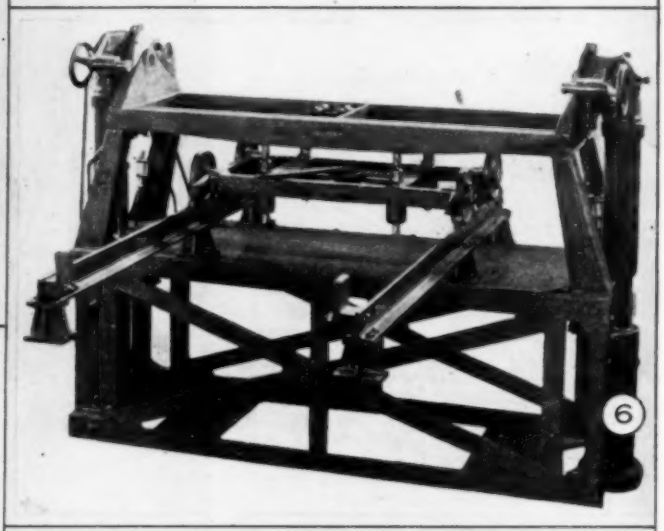


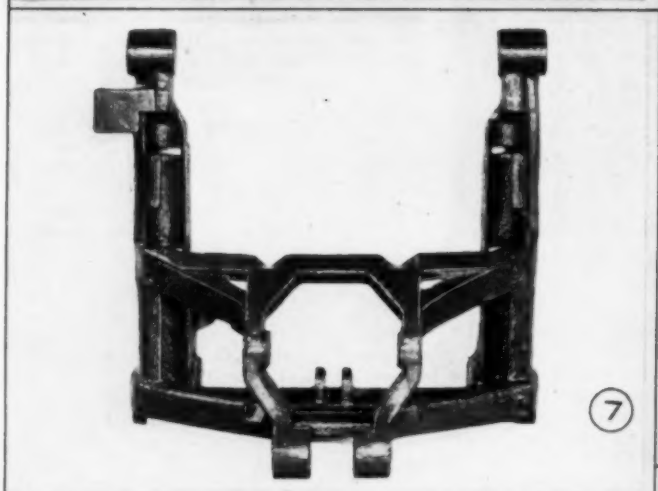
FIG. 2—GROUP OF JOBBING FOUNDRY PATTERNS MOUNTED ON WOOD PATTERN PLATES FOR MACHINE MOLDING

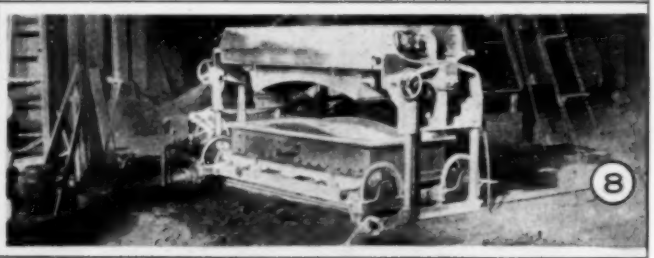


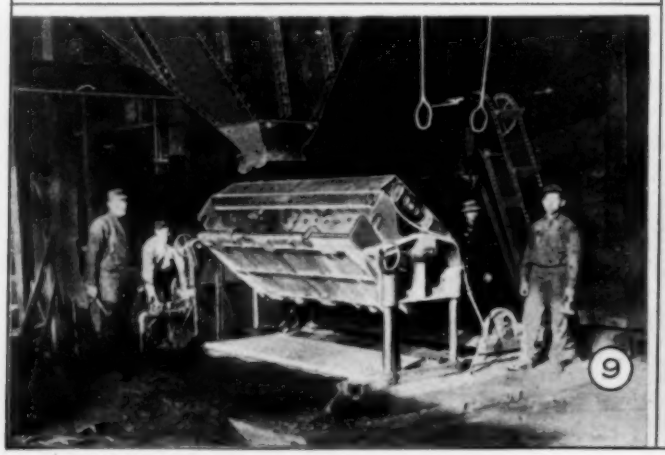












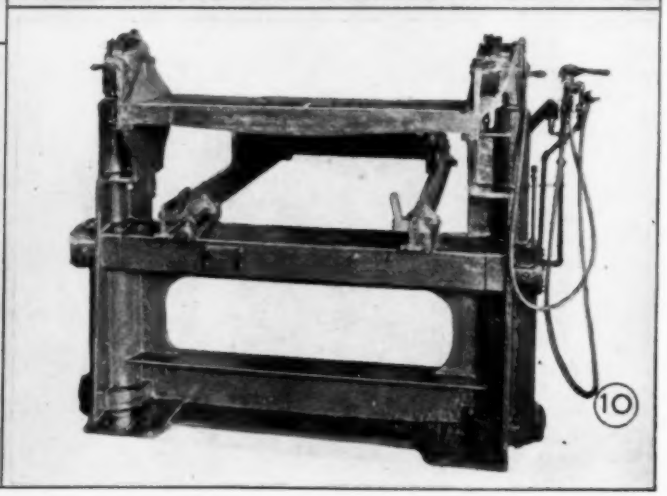


FIG. 3—CASTING TO ELIMINATE UNNECESSARY MACHINING. FIG. 4—SAME DESIGN BEFORE IMPROVEMENT. FIG. 5—DIFFICULT CASTING TO MOLD. FIG. 6—MACHINE COMPOSED OF SEVERAL CASTINGS. FIG. 7—CASTING TO ELIMINATE JOINTS. FIG. 8—MACHINE SHOWN IN FIG. 9 WITH MOLD ROLLED-OVER. FIG. 9—JAR-RAM ROLL-OVER MACHINE. FIG. 10—MACHINE JOINTS ELIMINATED.

Table I

Memorandum of Saving in Ship Castings

Name	Quan.	Machine molding Mch.	A	B	C	Cost, ea.	Hand molding A da.	B da.	C	Cost ea.	Saving Val.	%	Man days
A—Low pressure Cly.—45-in. bore	24	407	4	4	6	5.25	1–3	2–3	72	31.50	$ 630	83	120
A—Int. Cyl. 24-in. bore	24	407	4	4	6	5.25	1–5	2–5	120	52.50	1134	90	216
B—High pressure Cyl.—20-in. bore	24	407	5	4	5	4.20	1–1½	2–1½	36	15.75	277	73	52
C—Housing	72	407	15	4	5	1.40	1	2	72	10.50	655	87	124
D—Propeller	24	407	4	3	6	4.13	1	2	24	10.50	153	60	30
E—Steering Eng. Cyl.	24	406	20	3	1	.83	1	2	24	10.50	232	92	47
E—Vent. Gear	72	406 or 407	20	4	4	1.05	1	2	72	10.50	680	90	56
Total	..	...	..	26	..	...	.....	14	..	....	$3761	..	645

Total saving, $15,000 per month
Average percentage of saving, 85 per cent.

A—Output. B—Men. C—Time.

The engineers will quickly answer, "Well, what is that to us? Shall we spend our time looking out for the foundry? Does not the foundry give us any and most everything we design, and that too without speaking a word of complaint?"

Well, foundrymen, I'm ashamed to say it, but I believe they are right. For all these years you have gone on and on, giving the engineer everything he designs, putting up with the same old difficulties, and making the castings in the same old way. The foundrymen will admit that this is doubtless true and ask: "What can we do to help matters?" I reply, "Use all the knowledge you have, for the present, and endeavor to convince the engineers that they should give due consideration to foundry operations."

Is it not time that the foundries produce a man who by education and experience understands that castings, to be made successfully with unskilled labor, should not have some of the complications just mentioned? Let us train such men both in our schools and colleges and in the school of experience. Let us call him a foundry engineer, and when these casting difficulties arise, send the foundry engineer to the customer's engineering department, and point out the difficulties encountered in production, suggesting changes, and in engineering terms meet the objections of the customer's engineer and then offer a substitute. In addition, stay with them until the casting is changed or it is conceded and agreed that no change should be made. This method of procedure may seem slow and it may appear that it would require years to effect any change in the industry, but I believe now is the time to start.

Then, again, because engineers in general are not conversant with what the foundry can do, there is a large amount of manpower being lost in machine shop operations. There are many machined joints being made today that can be made more cheaply and better by casting the parts integral in the foundry.

My years of enginering experience lead me to state that engineers in general, that is, the large majority, do not understand thoroughly either patternmaking or molding, especially machine molding, and consequently they are unable to design intelligently and in the most efficient manner. But

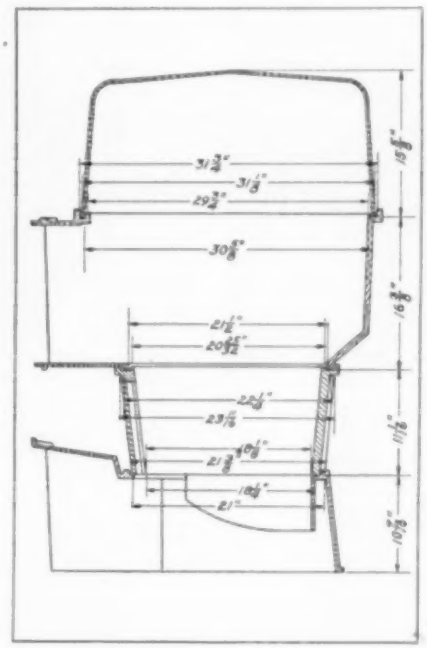


FIG. 11—DESIGN FOR HOUSE FURNACE—A SAMPLE OF DIFFICULT MOLDING THAT CAN BE HANDLED ON THE MOLDING MACHINE

in contrast, the engineer is thoroughly familiar with and understands machine shop practice. In his education he has received instructions and experience in up-to-date machine shop practice, while in most cases his foundry training and experience was limited to old methods, and machines, if used at all, were not of modern design.

This lack of interest regarding foundry operations applies in some cases to the management as well, for we find them spending tens of thousands of dollars for machine-shop tools, where they are not willing to spend hundreds of dollars for foundry tools.

Now, foundrymen, why are these things true? Why not accept some of the responsibility of the present foundry conditions and then do your part in convincing the engineer and the management that the foundry can no longer be overlooked and considered a dirty and disagreeable place, not worthy of consideration.

The specialty foundrymen have been, and are trying to make the foundry a better place in which to work; but there is no reason why the jobbing and other foundries should not be doing their part. The engineer will welcome your co-operation and when you work together for the good of both, then all foundries will be, as the specialty foundries now are, equal in progress to other industries.

The illustrations which accompany this article will clearly and forcibly impress the mind with some new possibilities, especially those of general machine designing and its relation to modern machine molding. They also will show the good results that flow from properly preparing and making the patterns, all for the purpose of saving in the foundry the skilled manpower that today is so essential to build ships and make munitions to win the war. We have been accustomed to think of the foundry as a dark, dirty, dusty, disorderly and unhealthy place, but the modern foundry is as light, clean, clear, orderly and healthy as any other of the industrial shops.

Before proceeding in detail to show the advantages to be gained by the

Table II

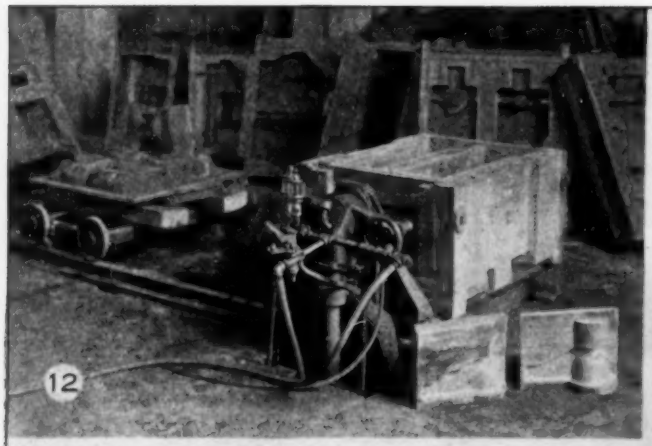
Memorandum of Saving in Ship Castings

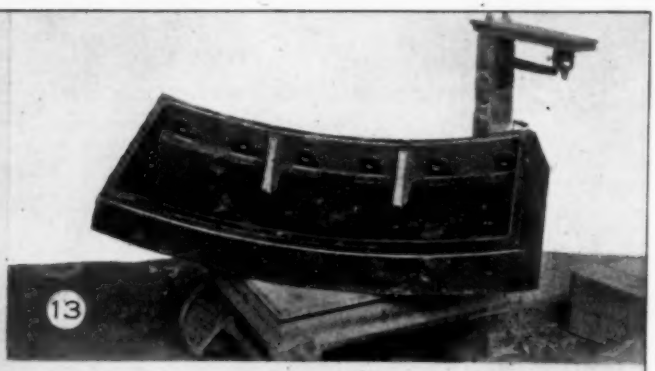
Name	Quan.	Mch.	Machine molding Output	Men	Time	Cost, ea.	Hand molding Output	Men	Time	Cost, each	Saving Value	%	Men days
22-in. Bits—C	600	406 2 bxs.	30	4	20	.70	2	2	300	5.25	$2730	86	520
Core	2400	404	140	2	17	.086	16	1	150	.375	693	77	116
Total	....	...	...	6	..	...	..	3	...	...	$3423	..	636
9-in. Bits—B	1800	406 2 bxs.	35	4	52	.60	3	2	600	3.50	$5220	83	992
Core	7200	404	140	2	52	.086	36	2	200	.33⅓	1780	74	296
Total	....	...	...	6	..	...	..	4	...	...	$7000	..	1288
1-in. Bit—A	600	405	40	3	15	.413	6	2	100	1.75	$802	76	155
Core	1200	403	150	1	8	.04	25	1	48	.24	240	83	40
Total	....	...	...	4	..	...	..	3	...	...	$1042	..	195
Mooring rings Dwg. H-52—No. D	1200	405	40	4	38	.525	9	6	167	3.50	$4462	85	850
No. E	300	...	...	..	..	...	..	..	...	...	....	..	...
Core No. D	2400	403	100	2	30	.12	18	1	167	.33	630	63	107
No. E	600	...	...	..	..	...	..	..	...	...	....	..	...
Total	....	...	...	6	..	...	..	7	...	...	$5392	..	957

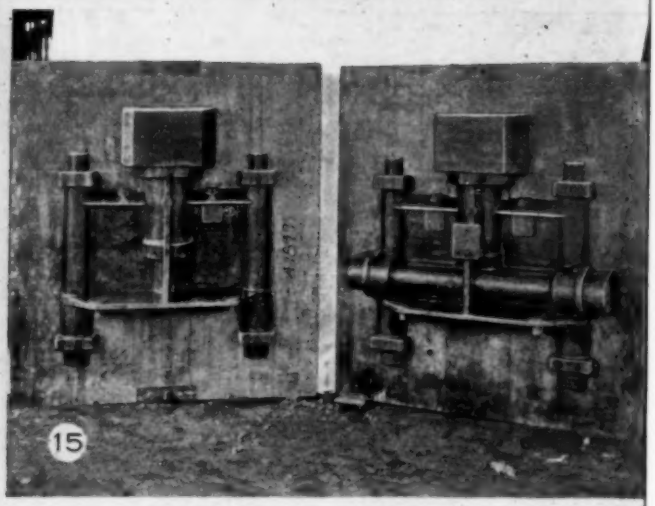
Total saving, $16,577.00

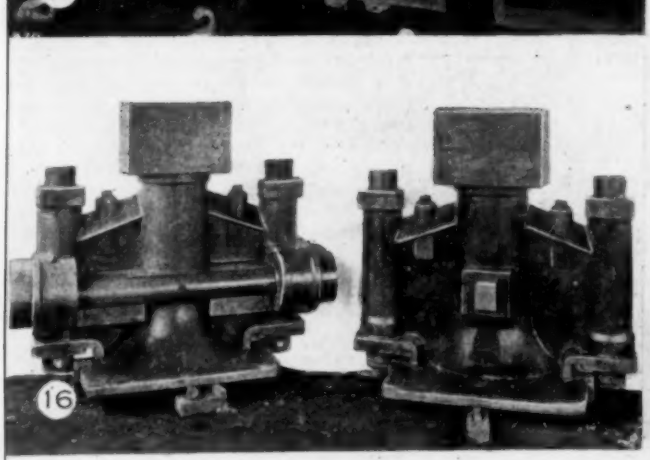
Total amount labor by hand molding (Man Days)	3,767
Total amount labor by machine molding (Man Days)	691
Saving in labor Man Days	3,076

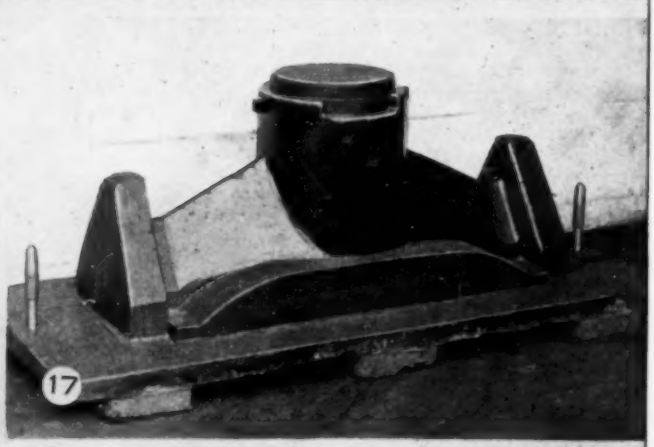
Average percentage of saving, 81 per cent.











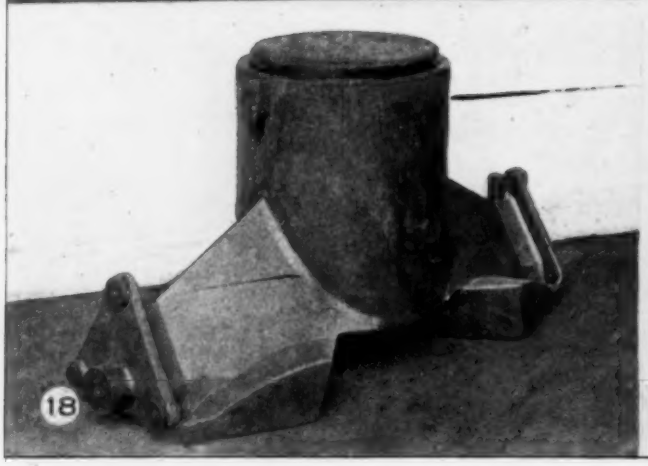


FIG. 12—MOLDING MACHINE WORK. FIG. 13—CASTING WEIGHING 1600 POUNDS. FIG. 14—AUTOMOBILE CYLINDERS MADE IN QUANTITY. FIG. 15—PATTERNS MOUNTED ON BOARDS FOR MACHINE MOLDING. FIG. 16—PATTERNS FOR HAND MOLDING. FIG. 17—PATTERN MOUNTED FOR MACHINE MOLDING. FIG. 18—PATTERN ARRANGED FOR HAND RAMMING. FIG. 19—WHAT MOLDING MACHINE CAN DO IN JOBBING FOUNDRY.

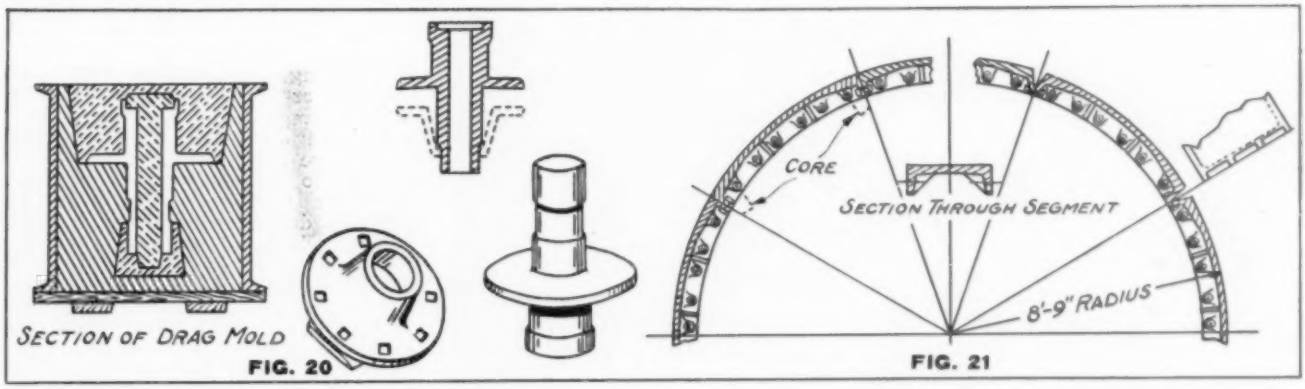


FIG. 20—HUB FOR AN ESCORT WAGON, AN UNNECESSARILY DIFFICULT DESIGN. FIG. 21—A SIMPLIFIED DESIGN FOR TUNNEL SEGMENTS

proper consideration of design, I wish to call attention to a few illustrations that will give the engineer an idea of what modern foundry production really is.

Fig. 13 shows a tunnel segment casting, weighing about 1600 pounds. This particular casting was made in large quantities, requiring a continuous run in the foundry for about two years. Fig. 1 shows the mold with overall dimension 8 feet 4 inches long, 42 inches wide and 14 inches deep. Observe in the background the large number of molds that are made and ready to be poured. Fig. 9 shows the machine on which the molds are made. In this view, the sand has been rammed, bottom plates attached, and the machine is in the act of rolling-over the mold. Fig. 8 shows the mold rolled-over and the pattern drawn. The output of this casting, before it was placed on the machine, was seven to nine molds a day with a skilled molder and helper, while the output of four laborers, working on the machine, was 141 drags per day. This was a daily performance for nearly two years. Fig. 14 shows an exceptionally large production from still another shop which is equipped with molding machines.

The foundries thus far shown may be termed special foundries, while that which we are most concerned about is the jobbing foundry or that foundry which does not have large quantity production from individual patterns. Therefore, Fig. 19 gives an idea of what may be accomplished in a day when a molding machine is used in a jobbing foundry. The machine shown here is known as a plain jolt machine. It accomplishes only a portion of the full amount of work required in making a mold. Fig. 12 shows a jobbing foundry machine of the roll-over type. The core boxes setting around this machine show how readily it can be changed to handle the many different boxes that are required for this work.

The roll-over jolt machine represents the greatest progress made in machine molding as applied to the jobbing foundry. Fig. 2 shows several jobbing foundry patterns made of wood and mounted upon wood pattern plates for machine molding. Fig. 18 shows a pattern as ordinarily made for hand-rammed floor production. Fig. 17 shows the same pattern mounted for machine molding. Fig. 16 shows another pattern as made for hand-rammed molding. Fig. 15 shows a similar pattern when made for machine molding. Fig. 24 shows another large, long, difficult pattern after being arranged on boards for machine molding and before these changes were effected.

All of these patterns after being placed on pattern boards for machine molding, showed an increased production of from 100 to 600 per cent, while records show that if the pattern is originally made on a pattern plate for machine molding, its cost is less than when made to be used for hand-rammed molding.

These views are shown in order that engineers and manufacturers may realize that if all their patterns were made for machine molding the price per pound of castings would doubtless be less, and if patterns were so made, it would give the foundries an opportunity to install molding machine equipment which without the co-operation of the engineers and manufacturers they do not wish to do.

Fig. 23 shows a difficult molding job for a foundry. The particular design cannot be criticised as this shape is quite necessary. Therefore,

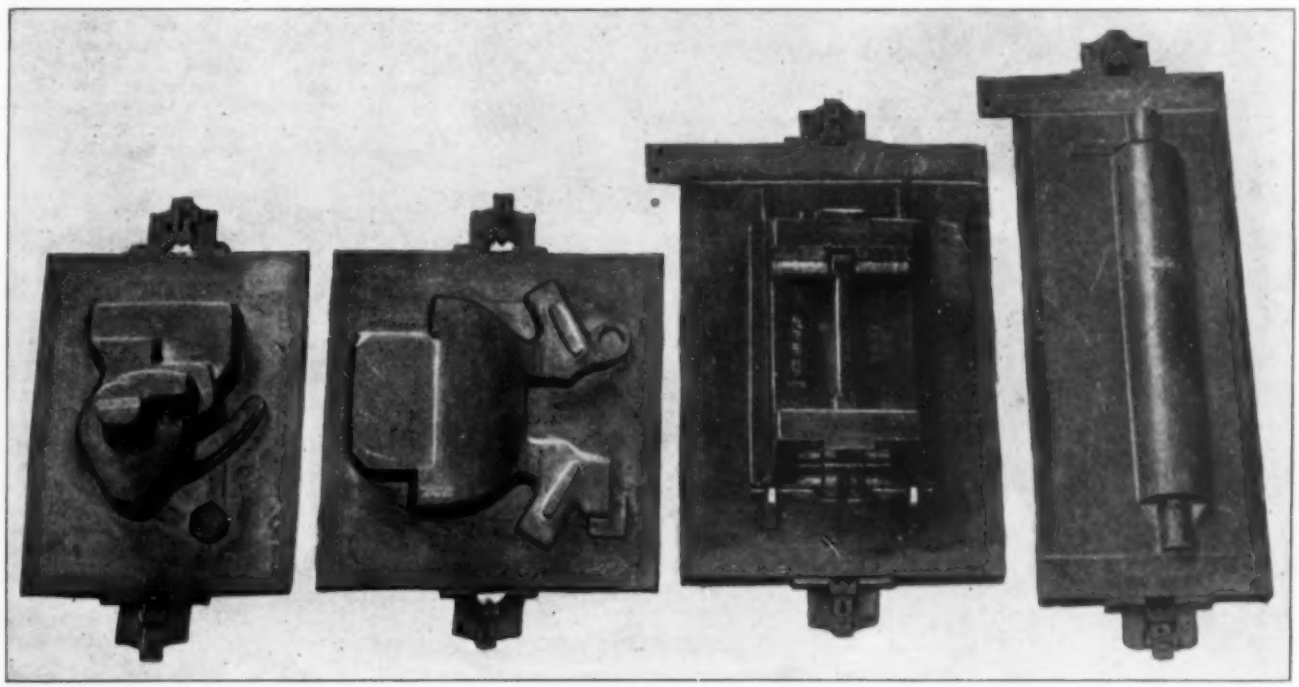


FIG. 22—GROUP OF JOBBING FOUNDRY CASTINGS MOUNTED ON PLATES FOR MACHINE MOLDING

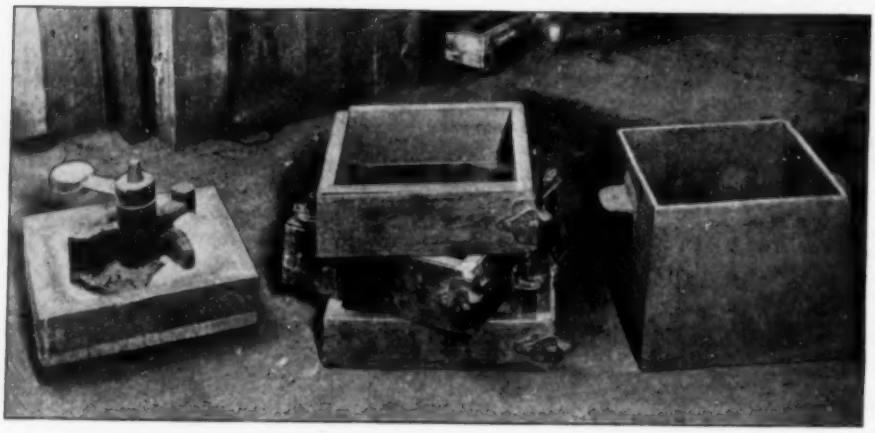


FIG. 23—PATTERN OF A SHAPE BEST ADAPTED FOR FLOOR MOLDING

the outfit shown can be used only on the floor, in which manner the greatest production can be obtained. This, however, cannot be said of all the engineer's output as many times the foundryman finds his design similar to Fig. 25, in which he has complicated molding by drawing a bracket with round bosses, while the more economical design would be that shown at the top, in which the bosses or loose pieces are eliminated.

Fig. 26 shows the necessity of the engineer understanding foundry operations for if the mold is to be made on the floor by hand, the rib indicated as "loose piece" in the design (shown at the top) should be on an angle in order to eliminate the core as shown on the bottom of the illustration, but if this particular casting was to be made on a molding machine, the horizonal rib is then in order, since when made on a molding machine, the loose rib (shown at the top) would not give the desired results.

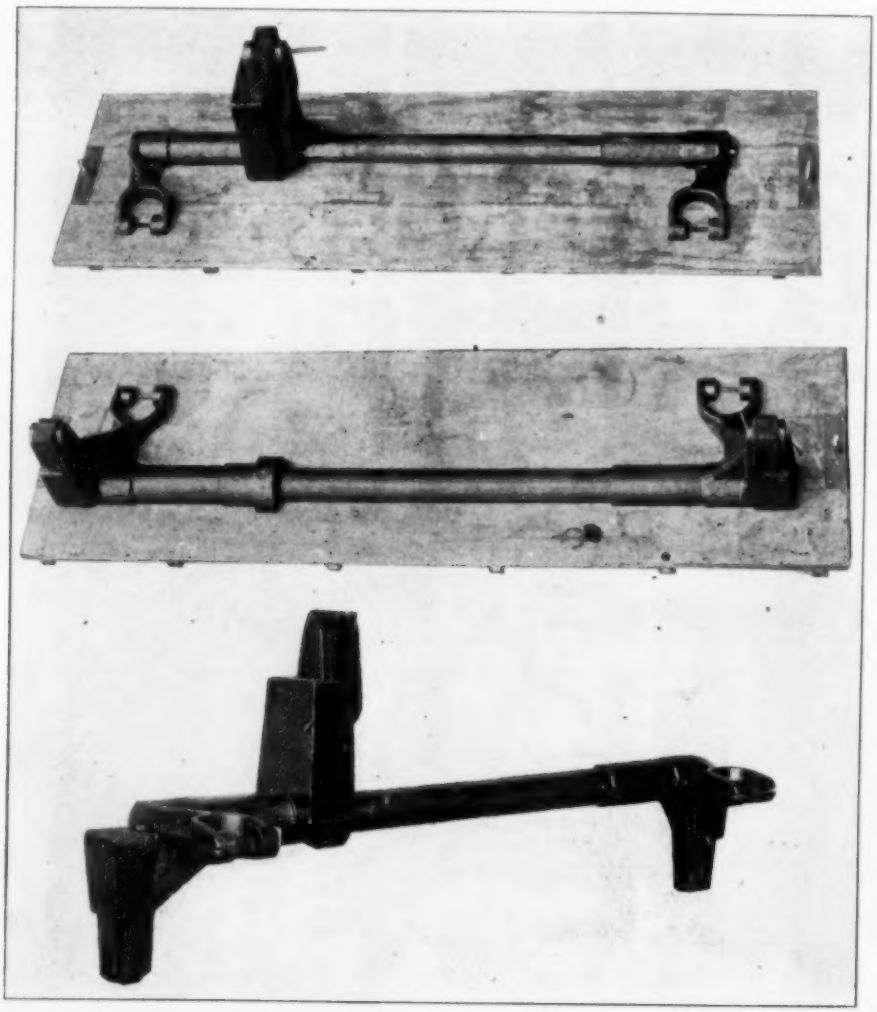


FIG. 24—THE TWO UPPER ILLUSTRATIONS SHOW INTRICATE SHAPED PATTERNS MOUNTED ON BOARDS FOR MACHINE MOLDING—THE LOWER VIEW SHOWS THE SAME PATTERN BEFORE BEING ADAPTED FOR MACHINE MOLDING

Fig. 20 emphasizes the necessity of thoroughly analyzing the design in the drafting room before permitting it to pass as final. The casting shown in this view is a hub and flange, such as is used on escort wagon wheels. There were 500,000 of these particular castings to be made and, therefore, the more necessity for eliminating from the design anything that would require additional manpower. For some reason or other, you will notice that there is a depression in the stem of the hub and because of this depression, we have a difficult foundry operation. There seems to be no apparent reason for this depression for when made as shown above in the picture, there seems to be ample strength and in no way does this change in the design seem to impair its usefulness. The production of this casting with the depression necessitated the ramming core, which is just above the bottom board, in the mold, while the proposed design without the depression, would not require the core.

Fig. 27 shows this core in detail and the many operations involved in its production, and when we stop to consider that to produce this core for the entire quantity, the cost amounts to over $6000, you can readily see the great amount of manpower that was consumed.

Analyzing the Design

Referring to Fig. 13, the quantity of which was so great, and in analyzing this design for a possible saving of manpower, we wish to suggest the proposed change shown in Fig. 21. By using the design shown at the right of this view, there is eliminated the large core across the end of the mold producing the design shown on the left. The proposed design (at the right) does not at all decrease the strength, nor impair the utility of the casting in any way and yet the saving would have been enormous.

In regard to the saving of manpower in the machine shop by a design that will do away with the machining of joints, the following views show clearly the advantages thus gained. Fig. 4 shows a machine, the base of which is cast separately from the side cylinders, necessitating the machining of the joints and bolting them together with finished bolts in order to secure the rigid construction necessary. Fig. 15 shows the pattern of this particular base when made to be cast integral, while Fig. 3 shows a similar casting. You will note that the design is such as to eliminate many of the ribs and projections and practically one-half of the machining time. Fig. 7 shows another example of eliminating machine joints. Fig. 6 shows a machine, the base of which is built up of several different castings with machined joints, while Fig. 10 shows these different parts cast integral in the foundry. Fig. 11 shows the ordinary house furnace which as now designed is successfully made on the molding machine, yet a change in the design would increase and render less difficult its production.

Fig. 5 shows a view of a well known machine-tool bed. This casting was difficult to mold because of its many projections and uneven parting lines.

The automobile engineers and foundrymen have been pioneers in co-

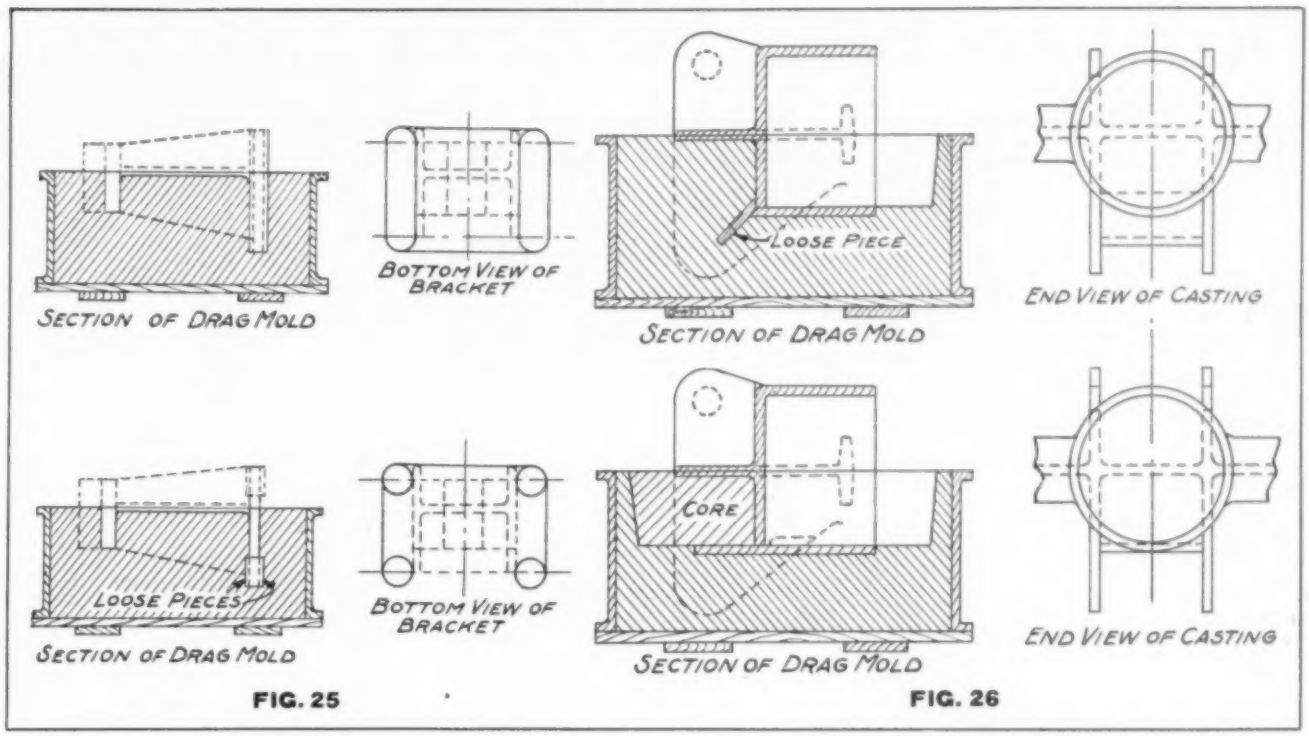


FIG. 25—BRACKET PATTERN WITH LOOSE PIECES FORMING BOSSES SHOWN AT BOTTOM WITH THE IMPROVED DESIGN AT THE TOP. FIG. 26—WHY THE ENGINEER SHOULD UNDERSTAND FOUNDRY PRACTICE—NOTE LOOSE PIECE IN MOLD AT TOP

operating, making possible the production of complicated castings in great quantity at a low cost. Their success is clearly shown by the fact that the automobile is today within reach of most everyone. Referring to tables I and II, an investigation of some of the castings used in this industry shows the enormous gain in manpower possible by the installation and use of the roll-over molding machine, even though the quantities are not as large as heretofore required by the specialty foundries.

Many of the ship casting patterns readily lend themselves to mounting on pattern plates, thereby making possible machine molding, while in other cases it is necessary to design the original pattern to be molded on a machine, and in a few instances designs can be profitably changed to eliminate some of the molding complications.

I wish to urge upon the foundrymen today to do their part in bringing to the shipbuilding engineers' attention the great possibilities awaiting their efforts to eliminate the present great waste of manpower.

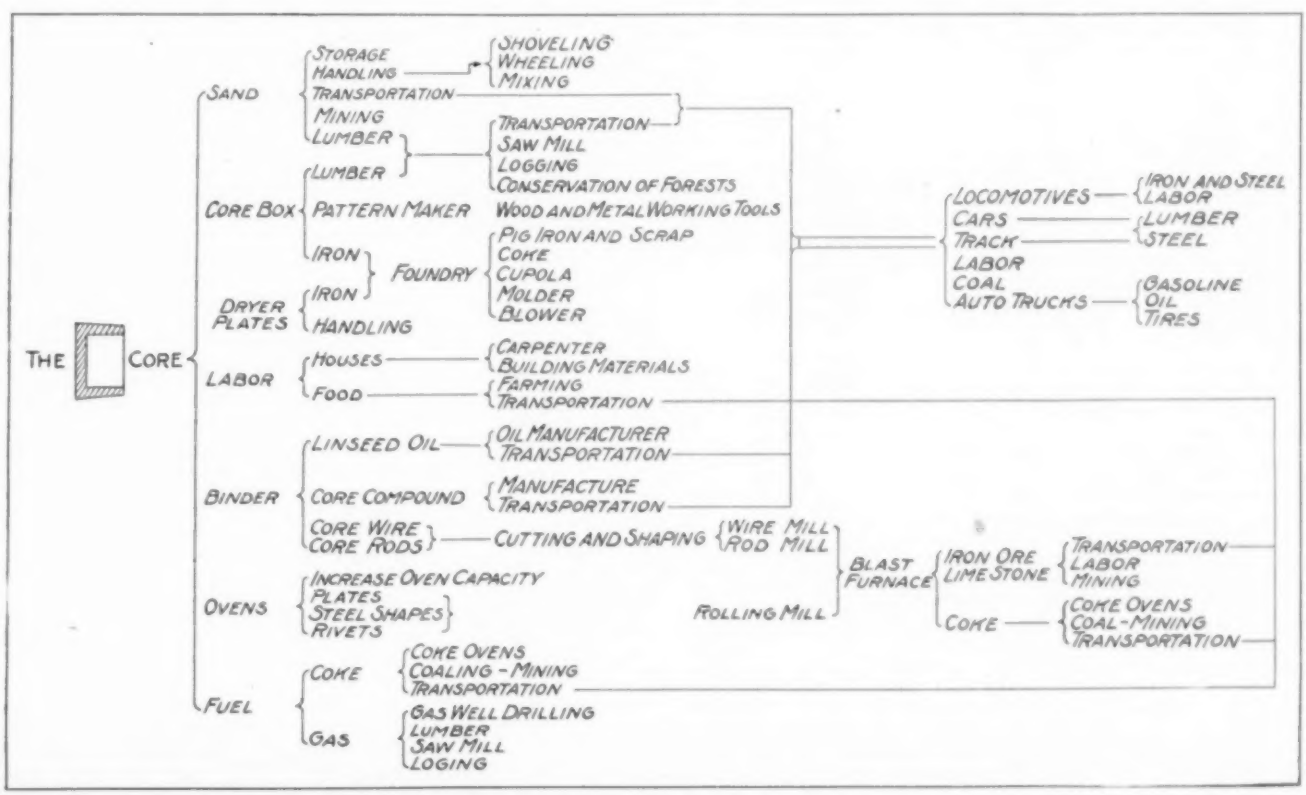


FIG. 27—THE LITTLE CORE FOR THE ESCORT WAGON HUBS SHOWN IN FIG. 20 AND AN ANALYZATION OF THE TROUBLE INVOLVED

Ordnance Steel for Army and Navy

Problems of Steel Castings Manufacturers in Meeting Government Specifications Are Discussed—Three Essential Elements of Proper Practice Are Presented

BY JOHN HOWE HALL

THE tests which have to be met on army and navy steels are shown in the accompanying table. For purposes of rapid comparison, I have shown the specifications of the army and navy, the American Society for Testing Materials and Lloyd's Register for similar steels in groups. The last group in this list requires no comment except that certain castings on the army blue prints are marked simply "cast steel" and this has been interpreted to mean a good grade of material such as would be supplied for commercial work and no specifications either chemical or physical have been called for on it.

It will be seen on looking over the chemical specifications in the first two columns of the table that in spite of the earnest efforts that have been made by the committee of the Steel Foundry society, it is not yet possible in a great many cases to use one and the same steel for both army and navy work.

Various Processes May Be Used

The army has consented to raise its limits on phosphorus to 0.06 per cent and on sulphur to 0.08 per cent for No. 1 and No. 2 steel and the same limits are allowed for No. 3 steel, provided the carbon is not over 0.35 per cent. If the carbon is over 0.35 per cent, phosphorus must be below 0.05 per cent and sulphur 0.07 per cent. This makes it possible to turn out Army No. 1 and No. 2 steel from either acid open-hearth, acid electric, basic open-hearth or in many cases from the tropenas converter without undue difficulty with fuel and raw material. The army No. 3 steel with phosphorus at 0.05 per cent and sulphur at 0.07 per cent cannot be met in the tropenas converter by most makers because the specifications of the army forbidding the rapid cooling of castings after annealing makes it impossible to meet the physical tests with carbon below 0.35 per cent. This steel, therefore, is usually made in either the open-hearth or the electric furnace.

The specifications of the navy as written call for such low phosphorus and especially sulphur that the tropenas foundries and in some cases the acid open-hearth foundries will find it impossible to meet the chemical specifications under existing conditions. It is the understanding of the writer, however, that the navy has waived the chemical specifications within reasonable limits on certain classes of castings on which they could be assured that the manufacturer turned out a high grade of steel in other respects and that he was capable of meeting the physical specifications of the steel in a satisfactory manner.

Lloyd's Tests Are Severe

Turning to the physiscal specifications, there should be no great difficulty in meeting the tests for Army No. 1 steel and for Navy B steel with properly made castings of about 0.25 per cent carbon and from 0.60 to 0.80 per cent manganese. These tests should be met by any good cast steel of this composition annealed in the usual way by heating several hours at about 1650 degrees Fahr. and cooling slowly in the furnace. The Lloyd's Register specifications for ship and engine castings are apparently intended to suit a steel of about the composition just given, although the bending test which they specify on a ¾-inch thick bar is considerably more difficult to meet than that of the army and navy or the American Society for Testing Materials. The fact that Lloyd's also calls for a maximum as well as a minimum in tensile strength might prove embarrassing in some cases, but the writer understands that Lloyd's and the American bureau of Shipping, whose specifications are closely parallel to Lloyd's, are not standing rigidly on the maximum specifications for tensile strength, provided the steel has sufficient toughness as exhibited by the extension and bend.

The writer has not had experience with recent tests made under Lloyd's Register, so that he is not able as yet to form any judgment as to the severity of the drop tests and hammer tests specified by Lloyd's bureau. The hammer test, which consists in slinging the castings in the air and hammering them all over with a 7-pound sledge does not sound to him very formidable, as it must be a very poor casting indeed that would develop any cracks or flaws under this test, especially if the annealing has been properly carried out. The drop test, which calls for dropping either one end of the casting or the whole casting on the hard ground, would seem at first sight to present no difficulties to the foundryman except the inconvenience of carrying out the test and the possibility of bending the castings out of shape. No doubt members who have had experience with these tests can contribute interesting opinions as to the value and difficulty of the test.

The physical specifications for medium steels, including Army No. 2 and Navy D, should be met with steel of about 0.35 per cent carbon and from 0.60 to 0.80 per cent manganese, but more trouble will be met with in the case of the navy steel as it calls for very considerably more strength and elastic limit than the soft steels and at the same time calls for the same extension, contraction and bend as that specified for Navy B. In the majority of cases the writer would recommend the use of a double annealing, such as will be described later, for Army No. 2 and especially for Navy D.

The hard steels, Army No. 3 and Navy A, are usually made of about 0.45 per cent carbon and from 0.60 to 0.80 per cent manganese, and steel of this composition properly annealed should meet the specifications in a majority of cases. For this class of steel the double treatment is even more to be recommended than for the medium steels.

The two specifications for special steels are apparently intended to be filled with nickel steel. The writer has had no experience in the manufacture of castings to meet these tests and is not prepared to state what difficulties would be encountered in executing orders to meet these specifications, although he has information of one foundry which is making steel from the acid open-hearth furnace to meet Navy F specification. This foundry is using steel of about 0.25 per cent carbon and 3 per cent nickel and is using a double treatment somewhat similar to that described further on, with the exception that the second heating is at a considerably higher temperature than that advocated by the writer.

How To Meet Navy F Specifications

In all fairness the writer feels he should say that if he is called upon to make steel for Navy F specifications he will use a special composition of steel with rather high manganese in proportion to the carbon, and will try to be allowed to heat-treat these castings by quenching in water or oil and reheating. This method of heat treatment is prohibited in the specifications but as the writer has had long experience in carrying it out he believes that it would be possible to persuade authorities to allow him to use it, and that he would be able to meet the specifications on all castings where oil quenching is possible. On castings too heavy or too complicated to permit of oil quenching he confesses he would be somewhat at a loss to know just how to meet these specifications with certainty, and hopes that the discussion of this paper will shed some light on this point.

It is difficult to overemphasize the importance of three principal factors, the neglect of which will cause the foundryman trouble in meeting these specifications. The first is that the steel must be properly made and thor-

From a paper presented at the annual meeting of the American Foundrymen's association, Milwaukee, Oct. 7-11. The author, John Howe Hall, is associated with the Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

oughly deoxidized, so that it will be quiet in the ladle and set sound in the castings and test bars. The steel must be made carefully, and usually the tonnage turned out is reduced on account of the slower and more careful furnace practice that must be followed. The second is that as much care, or even more care, must be taken in molding and pouring test bars as is taken with the castings. It seems a strange freak of human nature, yet foundries which are not familiar with specification work will in a great many cases be extremely careless with the designing, molding and pouring of the test pieces, in spite of the fact that the tests are not easy to meet, and are to be met not on the castings themselves but on the test bars. A little experience with heats lost because good test bars could not be turned up from the test coupons provided usually awakens the foundryman to the necessity of taking great pains with his test bars and coupons.

A number of designs of test coupon are used in different foundries, but the principle in all of them is to make sure that there is sufficient metal provided in some form of sink head or enlargement of the upper part of the coupon to make the lower portion perfectly sound and free from blow holes. The test bar or bars are generally cut, of course, from the lower part of the test coupon.

A Comparison of Specifications

SOFT STEELS

	Phosphorus	Sulphur	Tensile strength	Elastic limit	Elongation in 2 inches per cent	Contraction of area per cent	Bend test degrees
Army No. 1	0.06	0.08	60,000	27,000	22	30	...
Navy B	0.06	0.05	60,000	27,000	22	30	120
ASTM "Soft"	0.06*	0.06	60,000	27,000	22	30	120
Lloyd's Ship	....	....	58,240 to 78,400	.....	20	..	120†

Remarks:—"Drop" and Hammering tests also specified.

MEDIUM STEELS

Army No. 2	0.06	0.08	70,000	31,500	18	25	...
Navy D	0.05	0.05	70,000	31,500	22	30	120
ASTM "Medium"	0.06*	0.06	70,000	31,500	18	25	90

HARD STEELS

Army No. 3	0.05	0.07‡	80,000	36,000	15	20	...
Navy A	0.05	0.05	80,000	36,000	17	20	90
ASTM "Hard"	0.06*	0.06	80,000	36,000	15	20	...

SPECIAL STEELS

Army "Special"	0.05	0.07	90,000	55,000	15	25	...
Navy "Alloy F"	0.05	0.05	85,000	53,000	22	35	120

STEELS WITHOUT TESTS

	Carbon	Phosphorus	Sulphur
Army cast steel	...	...	...
Navy C	...	0.06	0.07
ASTM Class A	0.30 Max.	0.06	...

*For basic Steels, Phosphorus to be 0.05 per cent.

†Bend to be 1 x ¾-inch, corners rounded to 1/16-inch radius, bent to a radius of 1 inch.

‡For army No. 3 steel, if carbon is below 0.35 per cent, phosphorus may be 0.06 per cent and sulphur 0.08 per cent.

Care In Heat Treatment Demanded

The third point which has to be very carefully watched in the manufacture of these specification steels is the annealing or heat treatment.

The writer had a recent experience with a god friend in the foundry business who used a somewhat unusual chemical composition for Army No. 3 cast steel at the writer's suggestion. He did not for some time have very good luck with the tests, stating that the steel was "wonderful when it was good and rotten when it was bad." The writer at this time was very busily engaged in finding out why a few heats of steel which he had made could not be induced to pass these specifications and did not have time to pay a visit to his friend who was struggling with Army No. 3. After a month or two he saw the friend, who informed him that he had traced practically his entire difficulties to the heat treatment, and that he was then passing Army No. 2 and No. 3 specifications practically without rejections.

Whatever annealing and heat treatment practice is followed, it is absolutely essential to make sure that the castings are subjected to the proper degree of temperature for a proper length of time. To do this it is not sufficient simply to have a pyrometer in the furnace to read the temperature desired, because the pyrometer may not be indicating the temperature of the entire furnace, and for that matter the castings in the furnace may not have all reached the required temperature at the same time that the pyrometer did. The writer would hate to try to pass army and navy specifications with an annealing furnace so constructed as to make it impossible to look at the castings and judge their temperature by eye. If the castings are easily seen through a peep hole, it is possible to make sure that the color of the castings is the same as the color of the place in the furnace where the pyrometer is located and so avoid improper heating of the castings.

For what might be called old fashioned annealing of the average casting of average size, the writer believes that the steel should be heated to about 1650 degrees Fahr. for a period of at least two hours, and better for four hours. It is definitely known that a certain length of time is required for proper annealing after the castings are actually hot through at the desired temperature. For castings of average size it is not necessarily true that the annealing requires as much as four hours after the castings are hot, but from an experience of some years the writer has come to the conclusion that it is better to use too long than too short a time, especially as too short a time may mean that some of the castings do not even reach the desired temperature.

After the four hours heating at 1650 degrees Fahr. the castings may be cooled slowly in the annealing furnace, and if the chemical composition has been correct, this treatment should give the steel a sufficiently good anneal to pass any of the specifications that have been discussed in the foregoing. The writer, however, very much prefers to use a double treatment which consists in cooling the castings as rapidly as possible in air and afterward reheating them to a temperature of between 1200 and 1300 degrees Fahr., the exact temperature depending on the carbon and manganese of the castings. This second heating at a low temperature must in most cases be continued for a considerable length of time. The writer uses up to six hours at these temperatures in cases where the carbon and manganese are somewhat high, so that the principal thing to look out for is the extension and contraction rather than the strength. It might seem possible with this double treatment to use a somewhat higher temperature for the second heating and hold the castings at that temperature for a shorter period. It has been found, however, that for the best results, the temperature on this second heating should not exceed 1300 degrees Fahr. because to exceed that temperature does more harm than good. The writer has published data on this point at various times and the only object of referring to it here again is because he has run across several cases lately where two heatings are used and the second heating is so high that apparently better results would be secured by heating only once and cooling slowly in the furnace.

In the majority of cases where this double annealing is practiced it is better to cool in the furnace after the second heating, but this is not essential, since only very slight strains are set up in the castings if they are cooled in air from 1300 degrees Fahr., and the air cooling from this temperature does not affect the test bars enough to show up in the tensile test.

One of the most vexatious features in the production of castings to meet these specifications is the great number of tests that have to be made on each heat of steel. The army calls for one tensile test from a coupon cast attached to each castings over 200 pounds in weight, and the same number of tests from a separate coupon for each heat of castings weighing under 200 pounds. Under the stress of war conditions this specification is not adhered to rigidly, and in fact it is almost essential that it be modified in cases where a great many castings

are made on one heat which would usually call for a test on each casting under the strict letter of the specifications.

The navy calls for one tensile and one bending test from a coupon attached to each casting over 200 pounds and for two tensile and one bending test from a separate coupon for each heat of castings weighing under 200 pounds. In some cases the inspectors have demanded tests from two or three castings weighing over 200 pounds on a heat and have insisted that the two tensile tests from a separate coupon to cover the light castings on the heat should be taken from different coupons. When this specification is rigidly adhered to, the number of tests demanded from a shop making heavy heats of medium weight castings is so great that the job of taking care of the tests becomes a very onerous one. Having had experience with only a few orders of navy castings the writer is not aware just what modification may have been made in this specification in other shops.

For comparison with the requirements just enumerated it may stated that the American Society for Testing Materials calls for one test from each annealing furnace charge of castings, except when several casts of steel are represented in the annealing furnace charge. In this case one test is required for each cast in the annealing furnace. Castings under 500 pounds, or castings of such design as to make it difficult to attach a coupon, may be represented by a coupon or coupons cast seperate, in which case one test is required for each cast of steel. In order still further to simplify the testing of small castings a clause is inserted allowing the testing of small or unimportant castings by breaking up three or more castings from the heat, those castings to exhibit a proper degree of toughness and freedom from defects.

Lloyd's Bureau of Shipping requires one tensile and one bending test from a coupon attached to each casting and the specifications state that for larger castings two tensile and two bending tests will be required, and that if more than one melt of steel goes into the casting four tensile and four bending tests will be demanded. Not having executed any orders for them yet the writer is not aware how rigidly the inspectors are instructed to stand on this satisfaction or if any modifications have been permitted.

How to Make Ordnance Steel Castings

BY CAPT. E. R. SWANSON, U. S. A.

REQUIREMENTS as to physical properties for the three principal grades of steel castings for the ordnance department are now the same as those of the American Society for Testing Materials. The chemical properties also are identical with the American Society for Testing Materials specifications, except that greater latitude is given in the case of sulphur. For reference the figures are given as follows:

Cast Steel	Elastic limit per sq. inch	Tensile strength per sq. inch	Elongation per cent in 2 inches	Reduction of area per cent
No. 1.....	27,000	60,000	22	30
No. 2.....	31,500	70,000	18	25
No. 3.....	36,000	80,000	15	20

The time at the writer's disposal does not permit the extended detailed observation for presentation that the subject merits, and in fairness to the foundrymen, much matter available could not be published and accredited.

Practically all steel castings for ordnance purposes are made by the acid open-hearth, electric furnace or side-blow converter.

Two Methods Pursued

The problem of meeting requirements has resulted in the establishment of two methods. One makes use of combinations of low carbon and high manganese; the other, high carbon and normal manganese. The first method is of especial value to the converter shop.

The chemical analysis followed by a shop getting 98 to 100 per cent acceptances on first test for the No. 2 steel, using the converter, is as follows: Carbon, 0.26 to 0.30 per cent; manganese, 0.65 to 0.75 per cent; silicon, 0.26 to 0.35 per cent; sulphur, 0.07 per cent, and phosphorus, 0.05 per cent.

This steel is annealed by heating to 1650 degrees Fahr., soaking four hours at that temperature and cooling slowly in the furnace. This shop is not making any of the No. 3 grade steel.

One shop is working on orders various items of which call for No. 1, No. 2 and No. 3 grades. Their practice is to fill them all with steel of the No. 3 grade, using the converter process. Their chemical analysis is as follows: Carbon, 0.38 to 0.45 per cent; manganese, 0.75 to 0.85 per cent; silicon, 0.40 to 0.50 per cent; sulphur, 0.04 per cent, and phosphorus, 0.05 per cent.

This steel is annealed by heating to 1575 degrees Fahr., soaking four hours at that temperature and cooling slowly to 700 degrees Fahr. in furnace, at which temperature castings are pulled out into the air. This practice results in 95 per cent acceptances on first test.

Another Analysis

Another company using converters for the No. 3 grade, works to the following analysis: Carbon, 0.25 to 0.30 per cent; manganese, 0.90 to 1.00 per cent; silicon, 0.30 to 0.35 per cent; sulphur, 0.07 per cent; and phosphorus, 0.05 per cent.

This steel is annealed by heating to 1700 degrees Fahr., soaking four to six hours at that temperature and cooling in air. It is then drawn by heating to a temperature of 900 to 1100 degrees Fahr., depending on the carbon, and cooling slowly in furnace. This firm deals with the No. 2 grade steel in much the same manner except that the carbon in this case ranges between 0.24 and 0.28 per cent, with manganese between 0.85 and 0.90 per cent. The castings are annealed at 1750 degrees Fahr. with subsequent draw.

A most successful company using the electric furnace for the No. 3 grade, works to a chemical analysis as follows: Carbon, 0.25 to 0.30 per cent; manganese, 1.10 to 1.30 per cent; silicon, 0.35 to 0.45 per cent; sulphur, 0.05 per cent, and phosphorus, 0.04 per cent.

Castings are annealed by heating to 1650 degrees Fahr. and soaking three to four hours at that temperature, cooling in the air, and then drawing at from 900 to 1100 degrees Fahr., cooling slowly in furnace.

Another company successfully meets the requirements for both No. 2 and No. 3 grades of steel by making only one grade, namely the No. 3, using the electric furnace. Their average analysis is as follows: Carbon, 0.38 to 0.42 per cent; manganese, 0.60 to 0.70 per cent; silicon, 0.25 to 0.35 per cent; sulphur, 0.05 per cent; and phosphorus, 0.04 per cent.

They anneal this steel by heating to 1650 degrees Fahr., soaking at that temperature for six hours, and cooling the castings slowly in the furnace four to six hours.

The chemical analysis followed by a company using the acid open-hearth which has had 100 per cent acceptance is as follows: Carbon, 0.42 to 0.48 per cent; manganese, 0.65 to 0.70 per cent; silicon, 0.25 to 0.30 per cent; sulphur, 0.04 per cent; and phosphorus, 0.05 per cent.

Their practice is to allow three hours heating, two hours soaking at 1650 degrees Fahr., and five to eight hours cooling in furnace.

A resume of the foregoing shows the manner in which requirements are being met by companies having from 95 to 100 per cent acceptances on the first test. The high percentage of acceptances shows that specifications are not excessive.

Proper Chemical Analysis Needed

A very elaborate treatise could be drawn up on the subject of critical temperatures, length of annealing periods, etc. The critical point will vary according to the chemical analysis. You all know that to secure proper refinement of structure all parts of casting must be heated above the critical point and held long enough to permit necessary refinement. This period will vary according to the thickness of section.

Disclaiming any desire to criticise equipment or methods in shops having difficulties, it is desired to make this point—that No. 2 and No. 3 grades are being made successfully and commercially. In order to do this, two things are required: *First,*

Presented at the twenty-third annual convention of the American Foundrymen's Association, Milwaukee, Oct. 7-11. The author, Capt. E. R. Swanson, is associated with the inspection division, ordnance department, U. S. A., Washington.

control of analysis of product, so that the castings will analyze within predetermined limits; and *second*, annealing equipment of such nature that the furnace can be brought up to the desired temperature at a predetermined rate with equal temperatures prevailing in all parts of furnaces at the same time.

Control of analysis is had by competent supervision assisted by suitable chemical laboratory equipment.

Control of heat treatment can be exercised by the use of properly designed furnaces, so constructed that uniform heating prevails together with proper circulation; and the installation of proper recording pyrometers equipped with sufficient thermocouples so that furnaces can be checked for cold spots.

The absolute fundamental in meeting the requirements of the No. 2 and No. 3 grades is proper chemical analysis, supplemented by accurate annealing or heat treatment.

An extreme illustration of what has been done in the past, in a shop not equipped to anneal small castings, follows: The practice was to wait until a heat was poured which left a heavy skull in the ladle. The castings were annealed (?) by throwing them in the ladle and leaving them until the skull was cold. It is reasonable to assume that they experienced trouble.

Weaknesses Are Remedied

Most of the wideawake steel foundries have by this time discovered their weaknesses and have remedied them by installation of suitable up-to-date equipment.

Occasionally a heat is discovered that does not respond to proper heat treatment even though analysis is normal. An examination with the microscope will usually show the difficulty. Many companies are using the microscope as a daily check on their product. This is a refinement of practice that up to a short time ago prevailed in but very few foundries, but one of the many good things coming out of this world war is an improvement in the quality of steel castings that is really remarkable and of which the steel casting people can really be proud.

Production and Price of Fluorspar Increase

Statistics of the fluorspar industry in 1917, prepared under the direction of Ernest F. Burchard of the United States geological survey show a great increase in the domestic output of this valuable fluxing mineral as compared with former years.

The shipments of spar from the mines in 1917 were 218,828 short tons, valued at $2,287,722, an average price of $10.45 a ton, compared with 155,735 tons, valued at $922,654, or $5.92 a ton, in 1916. This represents an increase in total tonnage of 40.5 per cent and in total value of nearly 148 per cent. The quantity of crude fluorspar mined in the United States in 1917 reached a total of 280,825 short tons, compared with 175,165 tons in 1916, an increase of more than 60 per cent.

Mines in all producing states except Arizona reported an exceptionally heavy demand during 1917, and the high prices stimulated prospecting and led to the opening of many hitherto unworked deposits of fluorspar in Illinois, Kentucky and Colorado.

The apparently moderate average price received for fluorspar at the mines during 1917 was largely due to the making of sales on yearly contracts, but spar not so purchased was subject to higher prices. In January and February, 1917, gravel spar for prompt shipment brought $21.50 a ton at mines, and a year later $38 to $40 a ton was reported as the ruling price. The latter figures were unduly inflated because cold weather and railroad congestion retarded both mining and transportation. Prices decreased from these high levels later in 1918, so that in June and July $28 to $30 a ton at the mines was quoted for gravel spar carrying 85 per cent calcium fluoride.

Gravel spar constitutes the bulk of shipments and in 1917 the output of this product amounted to 183,144 short tons, valued at an average price of $9.61 a ton, compared with 133,651 tons, valued at $5.34 a ton, in 1916.

The imports of fluorspar in 1917 increased slightly in quantity but greatly in value, 13,616 short tons, valued at $8.42 a ton, having been imported in 1917, compared with 12,323 tons, valued at $4.38 a ton, in 1916.

The estimated production for 1918 is 218 000 short tons, considerably less than if sufficient labor, machinery and other supplies were available.

Potash is Produced from Blast-Furnace Dust

Present supplies of British potash show the important progress which is being made in the production of this valuable mineral in Great Britain One source of the new supply is from blast furnace dust, from which potash is obtained by adding a small proportion of common salt to the charge of the furnace, which releases the potash present in the ore and causes it to be volatilized with the emerging gases as potassium chloride. As the result of experiments, it is estimated that 50,000 tons of potash salts will be recovered every year from blast-furnace dust alone—enough to practically meet the demands of Great Britain.

A factory has been erected at Oldbury, near Birmingham, Eng., designed to produce 400 to 500 tons of potassium chloride weekly, from blast-furnace dust. A conversion factory is to be added where chloride, not needed for agriculture, may be converted into other refined potash salts. Other factories are in contemplation, and it is expected to obtain large quantities of potash from the Cleveland iron district. In view of the new importance thus given to blast-furnace dust, dealings in this raw material were placed under government control in Great Britain, in August, 1917.

The output of all potash materials in the United States in 1917 was 113,015 tons, which contained 28,898 tons, or an average of 26.4 per cent of pure potash.

Manganiferous Ores of the Cayuna Range

An interesting bulletin on "Manganiferous Iron Ores of the Cuyuna District, Minnesota," by Edmund Newton, has recently been issued by the experiment station of the Minnesota School of Mines. The ores to be found in this district are of two types, the iron ores and the manganiferous iron ores. Up to the outbreak of the European war it was not considered worth while to attempt to utilize the latter. India, Russia and Brazil furnished us with manganese at a price cheaper than we could mine our own ores, while Great Britain supplied us with ferromanganese. The entrance of Turkey into the war shut off the Russian manganese ore. The use of a large portion of England's merchant marine for war purposes, the ravages of German submarines, and the tremendously increased demand on shipping created a shortage of carriers and an enormous increase in ocean freight rates. As a result, the prices of manganese ores and alloys rose to record heights.

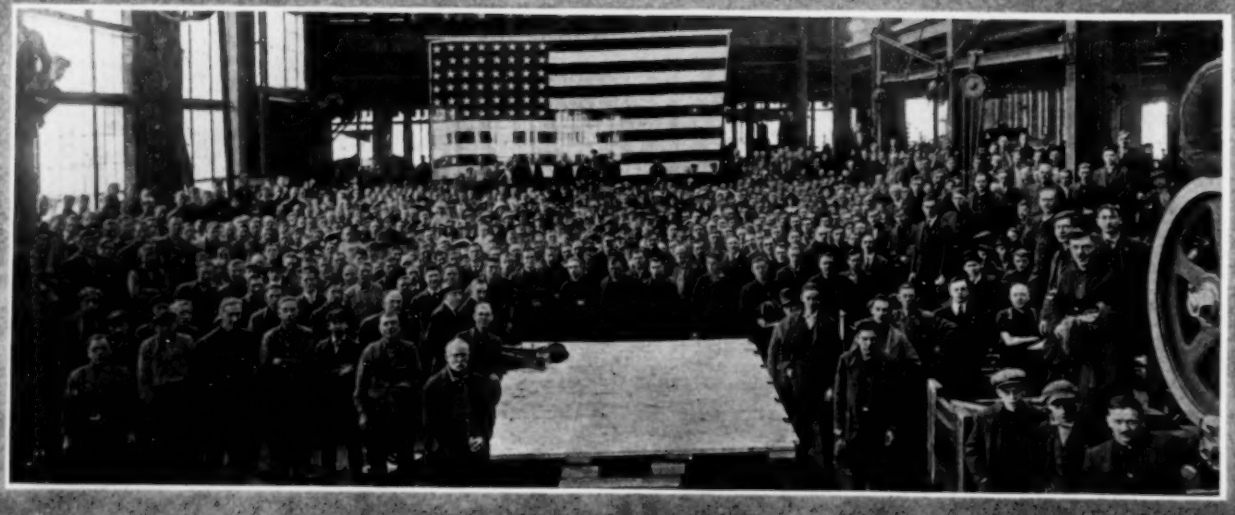
We have come to the point now therefore when it is advisable to study the question of domestic ores. In the volume at hand the author describes the topography of the Cuyuna region and gives its history. He then discusses the characteristics of both the iron ores and the manganiferous ores, and the effect which these characteristics have on the methods of mining employed. As methods of beneficiation vary with the character of the ores to be treated these are discussed from the standpoint of adapting them to the kinds of ores found on this range.

The remainder of the bulletin is devoted to the use of the manganese after the mining and concentration phases are finished. One chapter is given over to a general discussion of the uses of manganese. This is followed by a chapter on the metallurgy of iron and steel, and by other chapters dealing with the manufacture of pig iron and of steel and the uses of manganese in this connection. In discussing means of modifying the uses of manganese he arrives at the conclusion that it is unlikely that substitutes of a completely satisfactory character have been discovered here or in Germany, and that therefore when the war is over manganese will not be ousted from its place in the manufacture of steel. He also discusses minimizing the manganese content of finished steel and various modifications of the present methods of using manganese. In this latter connection he says, "The possibility of modifying present practice in the use of manganese in steel manufacture will have a decided bearing upon the increase in use of Cuyuna ore, in case such modifications are found to be commercially practicable."

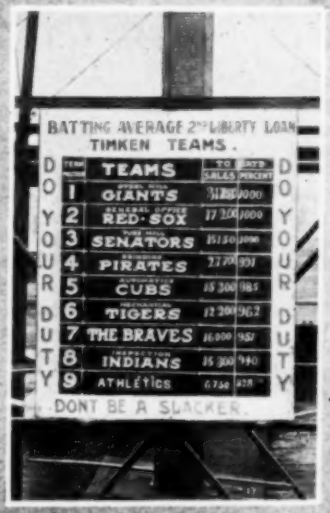
Funds and Products of Steel Plants

DAY TO DAY PROGRESS OF LOAN SUBSCRIPTIONS IN INDUSTRIAL PLANTS FOR THE THREE PREVIOUS LOANS WERE RECORDED IN MANY DIFFERENT WAYS. THREE ARE SHOWN IN THE TOP ILLUSTRATIONS. IN THE CENTER IS PICTURED A SMALL SECTION OF A CROWD OF WORKMENT AT THE SCHENECTADY, N. Y. WORKS OF

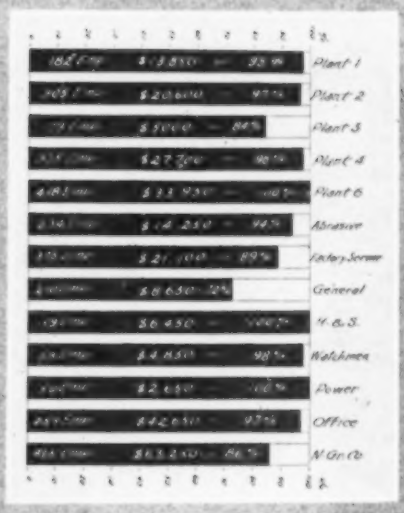
THE GENERAL ELECTRIC CO., ANSWERING THE QUESTION: "HAVE YOU BOUGHT A BOND?" BELOW IS SHOWN A GROUP OF WORKMEN ABOUT TO SING "THE STAR SPANGLED BANNER" AT A PATRIOTIC RALLY AND FLAG RAISING AT THE TOLEDO MACHINE & TOOL CO.'S PLANT, TOLEDO, O.

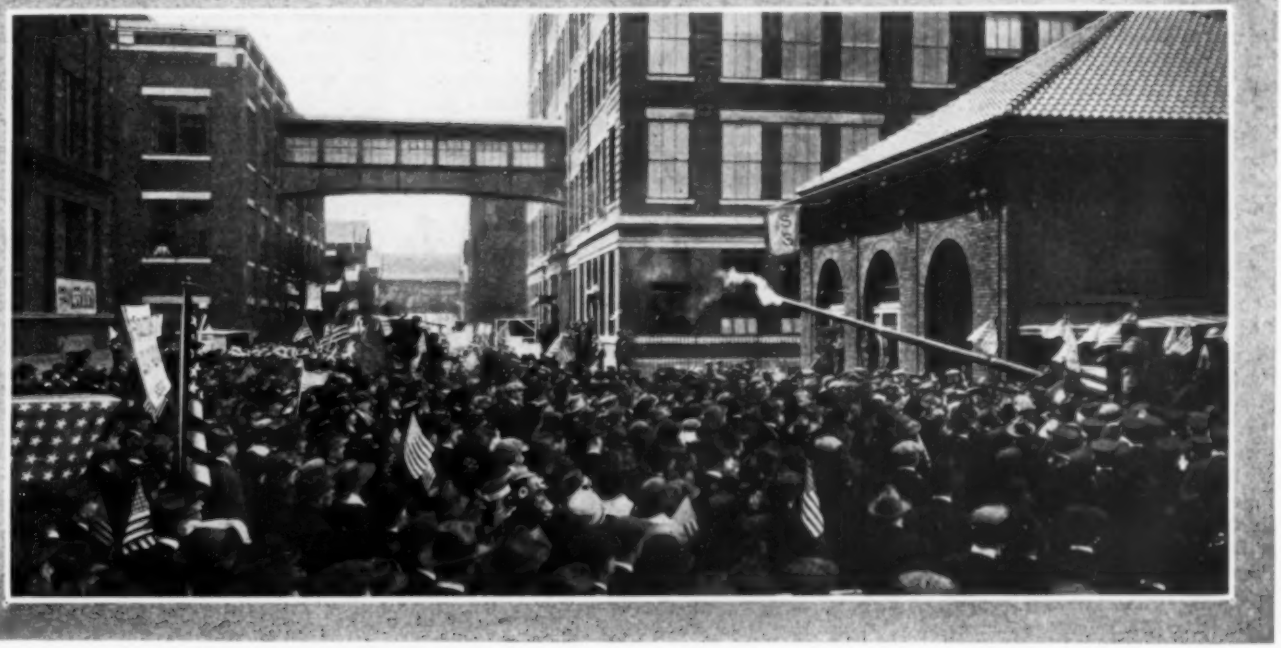


Back Country's Win-the-War Effort



ENTHUSIASM WAS AROUSED AT AN EASTERN MANUFACTURING PLANT BY SONG AND PUBLIC SPEAKING AS SHOWN ABOVE. TO THE LEFT IS ILLUSTRATED THE METHOD OF DEPARTMENTAL COMPETITION EMPLOYED BY THE TIMKEN ROLLER BEARING CO., CANTON, O., WHILE THE TWO NORTON COMPANIES' PLAN AT WORCESTER, MASS., IS ILLUSTRATED AT THE RIGHT. BELOW IS SHOWN THE "MESSAGE TO BERLIN" GUN WHICH WAS FIRED EVERY TIME A BOND WAS SOLD AT A PROMINENT ELECTRICAL WORKS.





Foundrymen Grapple War Problems

Head of American Foundrymen's Association in Annual Address Discusses Diversified Problems Which Foundrymen Have Had to Face During Past Year—Organization Rallies to Government's Support in War Program

BY BENJAMIN D. FULLER
President, American Foundrymen's Association

THIS past year has been so rife and so tingling with events vital to our very existence that it is beyond my limited powers to impress upon you the importance of what has been and is being done daily in our great country. The foundry interests of the country have taken their place among the leaders in the work of producing vitally needed material. Steel foundries have been particularly busy with armament, while the gray iron and malleable plants have been called upon to produce trench mortars, shells, hand and rifle grenades, etc. Aluminum and nonferrous foundries have to do with airplane and motor work. In many cases this entailed a transformation in shop equipment and shop practice which has been brought about quickly and cheerfully.

The sudden extraordinary demand for fuel and metal created by the government program and the response of the manufacturing interests has caused a pronounced shortage in iron which in turn has made it imperative that the government assume control and allot to the plants carrying on work essential to this program, their requirements. This has, in many cases, affected the manufacturers of nonessentials until such times as a readjustment may be brought about.

Plant Conversion Made Necessary

In the train of events and following closely this increase in capacity the iron foundrymen in certain lines have been confronted with a classification of their products as more or less nonessential with the result that many have been compelled to adopt a change of method, venturing into new lines of work, entailing expense in equipment, while others have temporarily closed pending developments; this is particularly true of the stove and hardware manufacturers. It is quite an undertaking to jump from the casting of stoves to the casting of shells, but this has been done by some and we will in all probability see many others follow.

The curtailing of pig iron shipments to those whose business comes within the category of nonessential industries has been a leading factor in the slowing-up of many foundries, with no immediate relief from increased shipments in sight.

Furnaces furnishing iron to foundries have been called upon to hold up deliveries of foundry iron and turn to production of steelmaking pig and while this has caused foundrymen to readjust and has more or less unsettled general business, the wonderful achievements of our government during the past year makes the inconveniences fade into insignificance.

The installation of foundry equipment and modernizing of methods has been tremendously accelerated. Manpower has responded to the call and the production secured by the combination of willing men and modern machinery has been in many cases fairly astounding.

The advance in quality of products also has been notable in many instances. For example, the development of the cast-steel anchor chain, a foundry product showing astonishing results under test. Electric and open-hearth furnaces both show improvement in results. Cupola operation is also coming in for closer study, the introduction of oil for fuel being one of the promising innovations in this connection. Alloys are now successfully produced in cupola practice for mixtures which a few years ago were made entirely by the crucible furnace process.

I would urge the conservation of coke as worthy of our earnest consideration and while it is not wise to save in the furnace to the extent of losing through poor product, there is much useless waste in cupola practice and close attention to quality of material, upkeep of equipment, regulation of blast and conservative charging will show a handsome saving in many cases. By-product coke is being manufactured to a greater extent than ever before. In the purchase of coke I would recommend adding to the specifications a clause defining the minimum size, or, in other words, that the foundry be furnished a screened material. Much inferior coke has been delivered, one of the chief defects being the large proportion of fines or breeze.

Coke Director Blauvelt has recognized this in recommending that coke shippers be penalized to the extent of $1 per ton for shipments of inferior material, a recommendation which would meet with hearty approval and support.

Our government in its endeavor to standardize many essential products, has touched the foundry industry in stoves and furnaces. Reducing styles and sizes in this industry, as in others, will effect great economies. A development which has been of peculiar interest is the changing from malleable to cast iron in the manufacture of hand grenades for the government, the change being made with a view to the safety of our troops. The change coming suddenly, was brought about quickly and with but slight disturbance to the industry, furnishing one more instance of the earnestness of the co-operation between the government and the manufacturer.

Semisteel Program of Interest

Of interest and promise to our industry is the adoption by the government of the semisteel shell. Experiments with cast shells seemingly have been sufficiently gratifying to warrant the government in specifying a liberal production and the prophesy that this will take an important place in the industry. Standard methods of producing a satisfactory product are being earnestly studied and should be of assistance to all. The production of semisteel shells promises also to be of interest to the malleable founder as the air furnace is seemingly the ideal unit for producing a high grade and uniform material.

At the Boston convention, last year, the American Foundrymen's association recommended to Secretary of War Baker the advisability of sending to France a selected committee of foundrymen for the purpose of studying methods of semisteel shell and ordnance manufacture. In view of the present call for semisteel production I am very sorry that this recommendation was not acted upon, General Crozier, to whom it was referred, not approving.

The difficulties in the way of successful production of these shells are by no means slight. Had the foundrymen been afforded the opportunity of acquiring first-hand knowledge of the French methods through a representative committee I feel it would have proved of great assistance today.

The production of grenades during the past year has been large. Much credit is due foundrymen for the manner in which shops have turned from altogether different lines to the successful production of grenade castings. The rifle grenade, made of malleable iron, calls for a casting soft enough to be easily machined and of tough composition, clean and sound with the cores centrally located, etc.

Such devices as multiple core boxes, ingenious arrangement of core plates, devices for turning out and handling

dry cores, molding machines, short cut methods of ramming and venting, etc., have brought about an average production in some shops of 1600 to 1700 castings per male machine molder per day, with 1200 to 1400 cores per day for each girl.

It is interesting to note that Milwaukee ranks sixth in number of foundries in the United States with a total of 94 as compared with 69 in 1916. In total number of foundries, Chicago is first with 188; New York second with 125; Cleveland third with 115; Philadelphia and Detroit are tied for fourth and fifth places, respectively, with 111, and Milwaukee is sixth with 94.

In Touch with Government

This association has been active and has been in close touch with the government. The service it has rendered has been thoroughly appreciated. The association's directors, secretary and manager of war service work will furnish interesting reports of its activities.

We can look to the future with great confidence as strict adherence to the policy we have always pursued, the policy of helpfulness to our industry in an educational and advisory way, will be productive of even greater results in the future than during the past.

How to Insure the Soundness of Castings

BY ENRIQUE TOUCEDA

THE writer can think of no subject of more vital interest to the manufacturer of malleable iron castings or one to which for his own welfare he should pay more strict heed than the integrity of the castings.

While many of the problems in connection with the metallurgy of the process have now been solved and we know with certainty the conditions that should obtain to produce regularly such a character of hard iron that when annealed it will yield metal of superior strength and ductility, as well as all details of heat treatment that will uniformly produce best results, failure on the part of some to make sure at all times that castings are invariably sound throughout remains the one deep-seated canker which if not cured bids fair to eat into the vitals of the industry.

It is not to be inferred that the malleable iron casting is unique in this particular, because the statement just made can be applied with even greater force to both steel and to nonferrous castings generally, especially in regard to blow holes of significant size and to internal strains, from both of which difficulties the malleable casting is exceptionally free. When unsoundness does exist it usually arises and has to do mainly with that character of porosity resulting from disproportionate sections in the casting which manifests itself as a rule, never in blow holes, as such arise from other causes, nor in voids of any size, but in a more or less fine sponginess which weakens the section at its location.

Value of Tests Is Great

There is great and unquestionable value derived from the physical tests of each air furnace heat for it is through such tests alone that the manufacturer can be assured as well as prove to the purchaser's inspector that up to and through the annealing process he has produced exactly what was sought; but this is as far as it goes, for the latter is not buying test bars, nor are these being used commercially. In what has preceded it has been implied that the majority of the producers of these castings are in a position to guarantee positively both the quality and uniformity of their product when measured by physical tests on test-bars from each heat. That this is true the writer can state unqualifiedly, while in the case of a more or less limited number a similar statement in regard to the integrity of their castings can be made with equal force and assurance; but that he is forced to make this particular qualification is exactly what has occasioned the choice of this topic by the writer.

It is more satisfactory always to be specific and to furnish data where such is possible. With this object in view I subjoin figures showing the combined monthly average ultimate strength and elongation of some 32 different concerns covering May, June and July, the data being gathered from many hundreds of tests made during each month.

May

Average ultimate strength, lbs. per square inch.	50171
Average elongation, per cent.	10.78

June

Average ultimate strength, lbs. per square inch.	50235
Average elongation, per cent.	11.14

July

Average ultimate strength, lbs. per square inch.	50715
Average elongation, per cent.	11.59

The above data should furnish justification for what has been stated as to the ability of many makers to produce with constancy a metal of superior strength and ductility, even under the handicap of inability, due to present stress, to make use of as good a quality of pig iron and fuel as are necessary for best production. Also, in looking over these records it is only fair to consider that included in them are bars from concerns in which high strength and ductility have been sacrificed to secure such a character of metal as would machine with the greatest ease, this property in these particular cases being the predominating requirement.

To illustrate what is possible of accomplishment there is recorded herewith a run of 24 successive heats, the bars having been received in three batches, the first consisting of 12, the second of six and third of six.

First Lot of Twelve

Average ultimate strength, lbs.	58493
Average elongation, per cent	22.91

In this lot one bar had an elongation of 29.00 per cent and another of 27.00 per cent.

Second Lot of Six

Average ultimate strength, lbs.	58033
Average elongation, per cent.	18.12

One bar in this set had only an elongation of 9.50 per cent, this lowering the average considerably.

Third Lot of Six

Average ultimate strength, lbs.	57371
Average elongation, per cent.	23.83

One bar in this set stood 30 per cent elongation.

The average ultimate strength of the 24 bars is 57,969 pounds per square inch, and the average elongation of the 24 bars is 21.62 per cent. If the manufacturer has been able to arrive at such a point of excellence where he can positively guarantee that the test bars from each and every heat will meet rigid and exacting requirements it is pertinent to inquire why in the case of many have they been so dilatory in connection with proper molding methods.

The writer is going to make an attempt to answer this inquiry correctly and to place the blame where it belongs. It is safe to assume that in the early days of the industry the malleable iron casting that was solid throughout was the exception. Lack of solidity, as already inferred, was not due to the presence of blow holes but was the result of failure on the part of the founder to recognize the fact that in castings of disproportionate sections, and by far most malleable iron castings are of this character, the thinner sections solidifying more quickly than the heavier ones to which they are attached would draw the metal from these still fluid parts before they in turn were able to secure their full quota of metal from the risers.

This state of affairs I presume was productive of so many failures that efforts were concentrated to better these conditions, first, presumably by varying the position and size of gates and risers, etc., but finally by some bright mind determining that the cause of the

From a paper presented at the annual meeting of the American Foundrymen's association, Milwaukee, Oct. 7-11. The author, Enrique Touceda, is a consulting engineer of Albany, N. Y.

trouble was fundamentally due to the difference in the rate of cooling of thin and thick parts. Once this conclusion had been reached it is easy to see that the use of the chills to equalize cooling was the natural and obvious outcome.

It was then perhaps found that while under the arrangement of gates and risers used the chill could not equalize the cooling sufficiently in the majority of cases to make heavy parts perfectly sound it did serve both to lessen the unsoundness, or shrink as it is called, and to drive it from a place where its existence meant scrap to a locality much less harmful.

While not positive, I feel quite sure that the use of the chill originated with the malleable iron founder. Be this as it may, its use in the early days, while an important step in advance, has since operated to deter progress along the lines of soundness to a greater extent than has any other agency, for the reason that the founder has remained content to adhere to this as a palliative rather than seek after the real cure. There has been a continual effort on his part to shift the boil on the end of his nose to some place on his body where it will be both hidden from sight and less painfully located instead of taking proper and effective steps to eradicate the cause.

Aside from cases of intricate and improper design in which it is practically impossible to properly feed the casting the chill has been baneful in its influence and a curse. As already stated there are now a large number of founders who are able to guarantee that the physical properties of their castings will square with that of the test bar. Such, for the most part, have discontinued the use of the chill and are so feeding their castings by means of large reservoirs of metal that soundness results and shrink is absent. These concerns have made a thorough study of molding principles; gates and runners are properly proportioned and properly set; also the pressure of metal entering the mold is so regulated by the height of the reservoir above the highest point the metal attains in the mold, that by virtue of this pressure or head, coupled with the mass of metal in the reservoir, the feeding of all sections, light or heavy, continues until solidification is completed. With these concerns the day of the chill has passed, and while a few must use it from time to time in extreme cases, even this will cease soon as the designor awakens to the fact that slight alterations in his design will render their need unnecessary.

Our opportunity is at hand because it has at last been demonstrated beyond a shadow of doubt that the most complicated malleable castings can be regularly produced by many concerns without a trace of shrink, and of a strength and ductility not thought possible some years ago. The engineer now knows this to be the case and knows as well that we have outgrown and made up for past misdemeanors. Discard the chill and in its place substitute risers or heads of such height and section as will furnish sufficient pressure of fluid metal to make sure the casting's integrity.

Have some one on the job who understands this art and keep him busy with every pattern that needs attention. Impress him with the thought that he is the most important man in the place, which under conditions now existing is the case, and hold him responsible for any lapse in the direction of unsoundness.

In breaking hard iron castings in search for shrinks do not assume that none are present until those thought solid have been annealed, because this treatment will develop a shrink not discernible prior to annealing.

In the malleable industry a new era has dawned, a fact frankly admitted and acknowledged by the trade. Let us stand shoulder to shoulder for mutual help in the matter of soundness. Let the integrity of the casting be the first consideration, for a solid casting made of ductile metal having an ultimate strength of but 40,000 pounds per square inch is unquestionably superior to one in which shrink is present though the test bars in the latter case yield an ultimate strength of 50,000 pounds per square inch and an elongation of 20 per cent.

Elastic Limit is Recorded by Solenoid

A convenient method for determining the elastic limit of materials is described in a paper presented by J. L. Jones and C. H. Marshall at the Twenty-first annual meeting of the American Society for Testing Materials, Atlantic City, June 25 to 28.

The apparatus employed consists of a semiautomatic solenoid recording device and an extensometer, and its use is said to enable one man to do the work formerly requiring the services of three, results being satisfactory. The apparatus may easily be applied to a standard testing machine, the specimen to be tested being placed in the machine in the usual way. When the extensometer shows predetermined elongations the operator presses an electric pushbutton, operating the solenoid, a punch mark on a card indicating the load at which elongation was measured. The operation is continued until the elastic limit is reached after which the apparatus is removed and the yield point of the material determined.

The solenoid recorder is so constructed that when the circuit is closed the armature is pulled up, striking a pivoted hammer and driving a prick punch against a moving card. After tests are completed the card is removed, the proportional limits of elasticity being determined from a curved line connecting the prick punches.

Coal is Analyzed in New Government Bulletin

A bulletin recently issued by the bureau of mines gives the analyses of coals from various mines in the United States. Bulletin 123, "Analyses of Mine and Car Samples of Coal Collected in the Fiscal Years 1913 to 1916," is a continuation of the sampling and analyzing of the coals of the country begun by the federal government in 1904. It is the third of the series, bulletin 22, "Analyses of Coals in the United States," which can now only be obtained from the superintendent of documents, government printing office, Washington, D. C., for 85 cents, being the first. The second bulletin of the series, bulletin 85, "Analyses of Mine and Car Samples of Coal Collected in the Fiscal Years 1911 to 1913," is still available for distribution by the bureau of mines.

The present bulletin presents analyses and descriptions of samples collected during the fiscal years 1913 to 1916. In order that the material in this bulletin may be used to supplement that presented in bulletins 22 and 85, the same plan of geographical classification has been followed, the analyses and descriptions of the samples being grouped in alphabetical order according to the state, county and town near which the mines or prospects sampled are situated.

The three bulletins, which do not conflict, constitute an extensive analyses of the coals of the United States and should prove of great value to those who purchase large quantities of coal. The day has passed when the industries buy coal as coal. They now buy heat units and know what they are buying. Bulletin 123 is of no particular interest to the domestic consumer of coal. It is for the industries that require large quantities of coal and to whom the cost of coal now is an increasingly large factor in the conduct of their works. Copies of bulletin 123 may be obtained free of charge from the bureau of mines, Washington, D. C.

Screw Thread Standards

The commission recently authorized by congress to ascertain and establish standards of screw threads in the United States has been appointed. In order to assist in formulating the program of the commission and to obtain the various viewpoints of the manufacturers and users of screw thread products, a hearing was conducted at 10 a. m., Oct. 7, in the Engineering Societies building, 29 West Thirty-ninth street, New York. This hearing was the first of a series of meetings to be held in various cities throughout the country. Subsequent hearings will be arranged to take place in New York, Dayton, Detroit and Washington.

The members of the commission are as follows: Dr. F. W. Stratton, director of bureau of standards, chairman; Col. E. C. Peck, and Maj. O. B. Zimmerman, representing the United States army; Commander S. M. Robinson and Commander E. J. Marquart, representing the United States navy; James Hartness, and F. O. Wells, representing the American Society of Mechanical Engineers; and H. P. Herr and E. N. Ehrman, representing the Society of Automotive Engineers.

The Pontiac Motor Car Co., Pontiac, Mich., which recently increased its capital stock from $150,000 to $200,000 is planning additional plant facilities. It is on a 95 per cent war basis.

Northwest Meeting Big Problems

Housing Question for Smaller Industrial Population Being Solved by Pacific Coast Cities by Diverse Methods—Shipbuilding Continues on High Gear—Iron and Steel Scrap Situation Reaches Serious Stage

(Special Correspondence)

SEATTLE, Sept. 28.—Industry in the northwest shows no signs of slowing down and the problems which usually accompany a great industrial movement are being met by the various communities where the changes are most pronounced. Among the problems which have called for and still are calling for unusual alertness on the part of citizens is that of housing the many workers. This is not confined to any particular locality but touches every city or town where shipbuilding and allied industries are active. Men must have accommodations for themselves and families if they are to remain. The fact that contracts would be sent elsewhere if conditions were not met has made it certain that they would be met.

At Seattle, the "More Homes Bureau" of the chamber of commerce and Commercial club has just closed a campaign in which it secured pledges for the building of 3552 dwelling houses or apartments between now and the first of the coming year. The aggregate value of the houses pledged exceeds $7,000,000. The pledges were given in writing by those who have the financial ability to carry them out. The city has been assured that if homes are provided for shipyard and other industrial workers, additional war work amounting to $200,000,000 will be placed with its plants. Portland, Oreg., is passing through a similar campaign and using every means to accommodate the thousands of workers coming to the city. Astoria, Oreg., near the mouth of the Columbia river, Olympia, Wash., and Anacortes, Wash., are among the smaller cities where industrial expansion has been such that additional homes are necessary for the newcomers. Commercial bodies and energetic citizens in all these centers have taken hold in a practical manner, and as housing accommodations are essential to the procuring of further contracts, there is little doubt the desired end will be attained. The government also is helping to a considerable extent, particularly at Bremerton where the Puget Sound navy yard is located. There a contract was recently awarded for an apartment house, hotel and some 250 residences to cost approximately $1,500,000, entirely a government project. To this the government has added the sum of $750,000 which will swell the number of dwellings to be erected to approximately 500.

Contracts for ship construction continue to be made by the government with northwest yards. The Tacoma Shipbuilding Co. was recently awarded a contract for six Ferris type vessels for the Emergency Fleet corporation involving between $2,000,000 and $3,000,000. The Albina Engine & Machine Works, Portland, has been awarded a contract for four steel vessels of the 3800-ton type and Kiernan & Kern another Portland concern has a contract for four government cargo carriers of 3500 tons each. Six additional ships of the Ferris type have been awarded to the Seaborn Shipbuilding Co. of Tacoma, making 14 in all contracted for by this company. The Kruse & Banks Shipbuilding Co., North Bend, Oreg., have been awarded six 3500-ton ships; St. Helens Shipbuilding Co., St. Helens, Oreg., two 3500-ton ships and George F. Rogers & Co., Astoria, Oreg., two of the same tonnage. It is reported that the Foundation Co. has secured contracts to build 20 full-powered ships of 3500 tons each for the French government, at Victoria, B. C., and that more building ways will be added to its plant at that place.

Building More Concrete Ships

Activity is increasing in concrete ship construction. The American Concrete Pipe & Shipbuilding Co., New York building, Seattle, is making rapid progress on construction of its yard at Bryn Mawr on Lake Washing near Seattle. A switch is being laid the full length of the property, 1200 feet, with which to bring in material. As soon as this is completed work will begin on the first way for a 7500-ton ship for private interests and ways will be laid for constructing two 500-ton barges for the use of the company. The West Coast Shipbuilding Co., Everett, Wash., has been awarded contract for construction of 14 132-foot concrete river transports for the embarkation service of the war department at $132,000 each. The Great Northern Shipbuilding Co. of Vancouver, Wash., has been awarded five 100-foot concrete water carriers for the embarkation service at $81,000 each.

In the matter of new yards there is still considerable movement. The Ilwaco Shipbuilding Co., Ilwaco, Wash., is a recent incorporation with $50,000 capital stock. It is officered by M. E. Sinclair of Ilwaco, and W. G. McPherson and F. H. Page of Portland. The Esquimalt Ship Co. is making preparations to establish a yard at Esquimalt, B. C. Its initial program of construction includes four wooden auxiliary schooners of the 2800 and 3500 types. San Francisco interests are reported to be backing the project. The Concrete Craft Corp. has been formed at Seattle for $100,000 by G. E. Kastengren, Israel Nelson and others. Offices have been established at 408 Leary building. The purpose is to build fishing craft and small craft generally and after the war pleasure craft. The plant will be erected at Salmon Bay, Seattle, and the officials have offered to assist the government in the building of small craft. The patents of the president, G. E. Kastengren, are to be used in construction. These patents cover permanent molds for concrete craft. He also has a patent covering a longitudinal truss which will constitute the backbone of the vessel and greatly lighten it.

There is much construction work going on and contracts being awarded which not only indicates the extent of northwest industrial development but gives some idea as to its permanency. The Northwest Steel Co., Portland, has awarded to the Pacific Bridge & Building Co. a contract for erection of a 65 x 420 shop building to cost $70,000. The Columbia River Shipbuilding corporation, Portland, will erect a plate shop, 80 x 581 feet, to cost $67,000. Work has been started on the erection of the $500,000 steel rolling mill of the Pacific Coast Steel Co. at Portland and the McDougall-Overmire Co. has been incorporated in that city with a capital of $50,000 to engage in ship outfitting and general ship repair work. Work has been started on a new plant for the manufacture of marine boilers, water and oil tanks, smokestacks and breeching. The incorporators are C. C. Overmire, president and manager; A. F. McDougall, vice president and Matt McDougall, secretary and treasurer. At Seattle, the Ames Shipbuilding & Dry Dock Co. has started construction of a new outfitting wharf, adding 900 feet to its present pier, and also work on additional plant facilities such as storage plots and other buildings on recently acquired acreage. The Skinner & Eddy Corp. has leased from the Alaska Steamship Co. for a period of two years land 1000 feet long and 500 feet wide south of its plant No. 1. This land will be used for the construction of warehouses and storage yards. The company also contemplates construction of a fabricating plant on the property and will provide facilities for the storage of coal and coke. A contract has been awarded by the Todd Dry Dock Inc., Seattle, to the Puget Sound Bridge & Dredging Co. for the con-

struction of three piers at its plant on the West Seattle waterfront. The piers are to be of creosoted piling. They will surround the dry dock and extend 800 feet into the bay. Buildings also are being planned. The cost will approximate $200,000.

Seattle as the center of the greatest activity in shipbuilding and allied industry in the northwest has had to contend with two particularly difficult problems, one of them being the question of housing workers, already mentioned, and which is in a fair way to be solved. The other has been the problem of transportation. This has evidently been solved according to latest advices. For years there has been contention between the city and the Puget Sound Traction Light & Power Co. the chief operator of electric car lines in the city. Adequate service was demanded of the company by the city which the company agreed to make if permitted to charge higher than a 5 cent fare. The state law was against this and the city refused to consent. The company refused to lease its lines but stated it would sell. Conditions finally reached a point where the government felt called upon to take a hand and in connection with the question of housing, better transportation for workers was one of the things required to assure the placing of future contracts for ships. The result has been that the city made an offer of $15,000,000 for the company's properties in Seattle. This has been accepted by the company and payment will be made in 20-year utility bonds bearing 5 per cent interest. The property to be transferred embraces more than 200 miles of street car tracks with overhead trolley system, 500 street cars, some of them practically new and eight car barns, together with a large assortment of railway equipment, etc. The transfer does not involve the power and lighting systems of the company.

As the permanency of northwest industry becomes more secure and commerce with overseas countries increases and promises to make greater strides after the close of the war, every port of consequence in the northwest is making preparations to increase and improve its terminal facilities. Seattle, at a recent election voted approximately $4,500,000 in bonds with which to add to and improve its $6,000,000 public terminal system. Included in these improvements will be a 2700-foot pier. Everett, Wash., has formed a port district and employed an engineer to work out the details of improvements. Negotiations are now being carried on with prominent Japanese shipping firms who are considering the question of locating a terminal there. Tacoma has recently been under the necessity of turning away thousands of tons of freight because storage facilities were not available and is now bending its efforts toward the organization of a port commission with a view to constructing adequate terminals. Portland is considering a number of improvements that will add to its terminal facilities, including adequate drydock and ship repair facilities; establishment of a railroad belt line connecting local and transcontinental railroads with water terminals and its port commission has employed an engineer to prepare plans for a coal dock which will be 90 x 500 feet in dimensions and cost $70,000 to $80,000.

Scrap Situation is Serious

The situation on scrap has been serious in the northwest for some time although slightly improved at present. Some has been brought in from Alaska; railroads have been supplying a certain amount and the southern part of the state of Washington has yielded up a quantity. Recently 1000 tons was brought in from the middle west which is being apportioned to Seattle, Portland, San Francisco and Los Angeles. For the purpose of accelerating the collection and suitable distribution of scrap iron and steel throughout the northwest, Emory E. Smith commissioner for the Pacific coast division of the American Iron and Steel institute recently held a conference with the Seattle advisory committee and another with the representatives of foundries, scrap dealers and government representatives. At these conferences all details regarding the available supply of iron and steel scrap, pig iron and coke were thoroughly considered. E. B. Swart, secretary of the Seattle advisory committee was named local field agent to inquire into the location of the various sources of supply and to enforce compliance with the government orders regarding collection, distribution and prices.

The pig iron situation, particularly in the Seattle district is not satisfactory and the shortage is estimated at 40 per cent. Consumption has increased very materially. New foundries are being started and others considered. Shipments are practically at a standstill. The bulk of the ore seems to be going to the middle west and there is complaint to the effect that there does not seem to be a full understanding of the work being done on the Pacific coast. Another reason for the shortage is doubtless the fact that a number of the furnaces are banked on account of not having sufficient coke. The shortage of labor also enters into the situation and before long the element of the weather will begin to have its effect. Some relief was recently afforded by the taking over of 1000 tons of pig iron which Mitsui & Co. had purchased and brought to the Seattle docks for overseas shipment some 11 months ago. This is being distributed to plants doing government work in Tacoma, Portland, Seattle and Everett through a local concern at $66.50 a ton, having been purchased on a rising market. The difficulties regarding coke have been largely overcome and the local coke interests are now trying to build up a supply for the winter.

The proposal of B. L. Thane and associates to erect a $25,000,000 steel and pig iron plant on Puget Sound comes at a time when circumstances would seem to show it is most needed. Mr. Thane, who is handling the engineering features of this project is head of the Alaska-Gastineau Mining Co. at Juneau and has associated with him in the steel project William H. Crocker of the Crocker National bank, San Francisco; Herbert Fleischacker, president of the Anglo-London and Paris bank of San Francisco; S. F. B. Morse, a San Francisco capitalist, and some of the strong eastern financial interests. More than two years have been spent, investigating conditions on the Pacific coast and the question of raw materials for the manufacture of steel and pig iron. These have been located and found to be abundant. Control of them has been secured and the interests back of this enterprise are convinced that these products can be manufactured as cheaply on the Pacific coast as anywhere in the United States. Mr. Thane who has spent the past four months in the east in the interest of this project recently arrived in Seattle. He states that the erection of the plant is assured and that progress has been as rapid as could be expected under present unsettled conditions. No definite time can be stated when actual construction work will begin.

On the point of the market, contracts for a very limited amount of pig iron are being placed for delivery for the first half of 1919, the price to be fixed at that time. There is not much movement in brass and copper tubes and it is difficult to fix prices because of the fact that labor conditions are not certain, until after the first of the year. One or two quotations have been made at Seattle for delivery after the first of the coming year at prices prevailing at that time. The price of iron pipe is considered prohibitive and there is no activity, wood pipe taking its place. No material change has taken place in the prices for castings in the last month.

The oriental market is stiffening materially. Considerable tonnage of 12 pound rails has been placed at $78 per gross ton f.o.b. Pittsburgh but the price now is $80 and over. Many of the mills have had to abrogate their contracts so as to allow the government the tonnage to ship 200,000 tons of light rails to France. Some licenses are being issued for steel bars under 3 inches at 4.75c to 5.00c Pacific coast, for shipment to Japan. There is considerable demand for steel pipe in Japan and some is being purchased for that purpose.

There is a shortage of labor in the northwest particularly of molders and machinists. Nothing has come through as yet from the Macy award board which began its sittings at Philadelphia on August 5 to make adjustment of wages in the shipyards.

Exhibit Shows War's Great Effort

Great Milwaukee Exposition of Foundry and Shop Devices Mirrors Nation's Bid for Victory—Manpower Saving is Keynote of Displays—Army Ordnance Department Has Extensive Educational Exhibit

IN these days when all the resources and every ounce of energy of twenty-one allied nations are concentrated on the single purpose of breaking once and for all the brutal war-lust of Teutonic despotism, there is only one standard by which the importance of any human enterprise can be measured—To what extent does it contribute to the one great task of winning the war? Viewed in the searching light of this question, aptly termed the acid test of 1918, the thirteenth annual foundry and machine exhibition, which opened its doors in the spacious new Milwaukee auditorium at 1 o'clock Monday afternoon has proved its essential character from every standpoint.

The foundry and machine exhibition has always been a great educational and business building force. This year its two hundred separate displays spread over 45,000 square feet of floor space were all attuned to the one fundamental purpose of the hour—*Victory!*

A study of the numerous and varied exhibits, which include almost every known foundry and shop device, was equivalent to a post-graduate course in the manufacture of war material in the great University of Experience. For at Milwaukee this week there was assembled the fruits of the experience of hundreds of the country's leading experts in the construction of ordnance and war apparatus of all kinds.

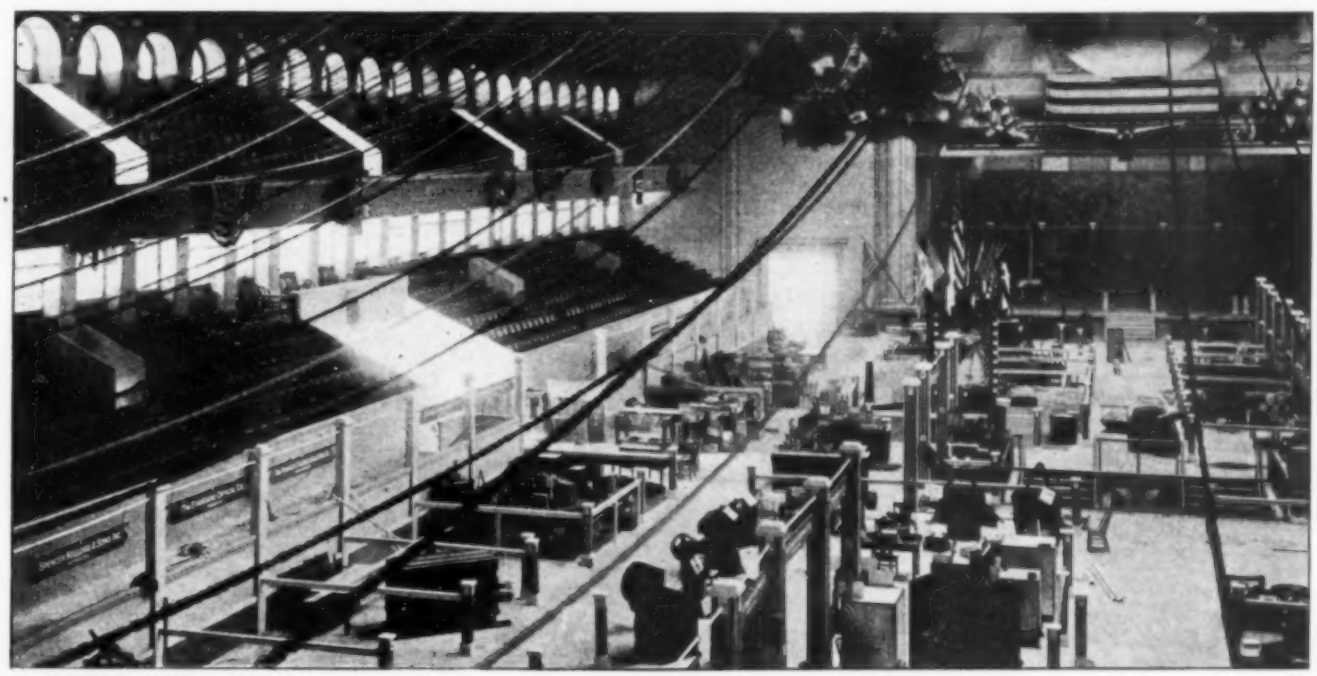
In booths on the lower floor of the exhibition building up-to-the-minute methods of molding and casting Newton-Stokes trench-mortar bombs, semi-steel shells, hand grenades, rifle grenades, military truck wheels, etc., were displayed by means of machines and apparatus in actual operation. The machining of these products and many others was also demonstrated through the medium of 32 live exhibits of machine tools and machine-shop appliances.

To the manufacturer seeking relief from the constantly tightening labor situation, the 1918 exhibition of foundry and shop equipment, which was held as usual under the auspices of the American Foundrymen's association, was a veritable revelation. In fact it is not too much to say that the conservation of manpower, for the purpose of releasing more men for the army without cutting down the production of essential and vitally needed war materials, was the keynote of the exhibition. In the displays of cleaning-room equipment, cranes, trolleys, hoists and other apparatus for handling materials, as well as in the exhibits of molding machines, sand-blast equipment, grinding machines and welding apparatus, were found specially pertinent suggestions bearing on the problem of obtaining more output with less men. Machines of the automatic or semi-automatic type were far more numerous than at previous shows.

Two vast floors of the great Milwaukee auditorium were crowded with exhibits. As the accompanying illustrations indicate, the show was arranged in an unusually convenient and attractive manner. An abundance of light and a vaulted ceiling tastefully set off with red, white and blue streamers contributed materially to an attractive general effect.

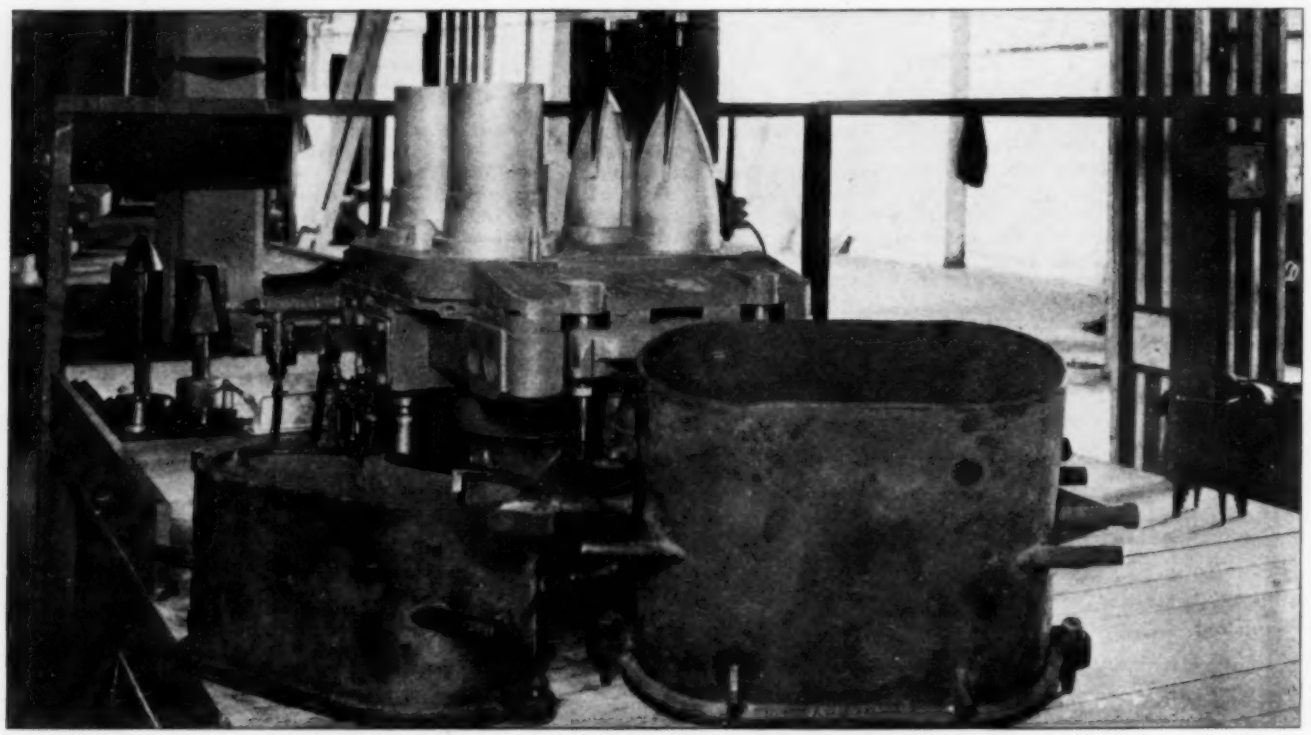
Prominent among the 200 displays was the exhibit of the army ordnance department which was under the supervision of Lieutenant Wallace. Its conception was purely educational and it amply fulfilled its purpose. In fact this display alone was worth a long trip to Milwaukee, especially to manufacturers coping every day with war production problems. The government's exhibit, in addition, formed an index of the vast capacity of the nation's war industries, which are now operating throughout the length and breadth of the country triple shifts to beat the Hun, for practically all of the numerous items in the display were produced within the Milwaukee district. The war exhibit under direction of Lieutenant Wallace included barrels of the famous 75-millimeter field gun in various stages of forging, together with finished barrels and slide mechanisms for both the French and American types. The slide on the French gun is a bronze casting. Steel shell of all kinds and sizes were exhibited, some of them being shown in section. Cast semisteel shells also were shown, together with Newton-Stokes trench-mortar bombs, airplane bombs, hand grenades, gas shell, gas grenades, smoke grenades, phosphorus grenades, gun limbers, truck wheels, tractor castings, etc., etc.

There were 21 exhibits by molding



IN THE GREAT MAIN ARENA WERE DISPLAYS OF FOUNDRY SUPPLIES, LIGHT MACHINERY AND WAR MATERIALS OF ALL KINDS.

machine manufacturers, including over 80 machines of various types and sizes. As is customary, many of the machines were shown in actual operation. Interest centered on methods of rigging-up the machines for war work, rather than on the details of the machines themselves, as at previous exhibitions. In fact molding machines have now become quite thoroughly standardized, and there are therefore fewer radical innovations from year to year. Within the past twelve months, also, the manufacturers have been so busy with production problems that experimental work on new machines has been relegated to the background, unless for some specific war purpose, such as the new Pridmore 8000-pound combined pneumatic and electric roll-over jar-ramming machine developed for



A COMBINATION JAR-RAMMING STRIPPING-PLATE MOLDING MACHINE SPECIALLY RIGGED FOR THE PRODUCTION OF TRENCH-MORTAR SHELL.

speeding-up the production of military-truck wheels.

A number of molding-machine manufacturers displayed special riggings which they have developed for adapting their machines to shell and grenade production and similar problems. Prominent among these was the Cleveland-Osborn Mfg. Co., Cleveland. This company, under the direction of H. R. Atwater, has designed an exceedingly interesting special rigging for molding Newton-Stokes trench-mortar bombs on a combination jolt stripping-plate machine of 1500 pounds capacity. This machine with the trench-mortar equipment, is shown in the accompanying illustrations.

The job, it will be noted, is arranged to go in a two-part cast-iron flask of rigid construction. In addition, a dry-sand cover core not shown in the illustrations, is employed as a cope, the two parts of the flask forming the drag and cheek respectively. The shell is cast to give or nose down, with the wind vanes firmly bedded in the sand in the drag. Both the drag and the cheek are molded at one time on the machine, which has a production of 175 molds a day. There are two castings in each mold; therefore each machine unit delivers 350 trench-mortar shells a day. The metal enters the mold through knife gates attached to the shell forward of the bourrelet. The knife gates lead in turn to vertical finger gates which carry the metal from the cover core through the cheek to the drag. Either a green-sand or dry-sand core may be employed. It is molded on a small plain jar-ramming machine, using a split core box of metal construction. The core is rammed around a pipe arbor of standard pattern.

The exhibit of Henry E. Pridmore, Chicago, again indicates the influence of foundry shell production on molding-machine design. An entirely new stripping plate machine with electric jar mechanism and air stripping feature has been developed by this company for use in making shell molds. This machine is a refinement of design based on the performance of standard machines which are in service in some of the first foundries which produced cast shells in this country. One of these machines is shown in operation. The other molding machines displayed include a 24-inch combination electric jar-ramming and air power rock-over hand-draw machine with a 9-inch drop; a 24 x 24-inch, 8-inch draw combination electric jar-ramming and air power stripping-plate machine; a 16-inch, 9-inch drop combination electric jar-ramming and hand rock-over drop machine; a 29 x 24-inch, 8-inch drop power rock-over drop machine; a 12 x 12-inch square stand machine and a heavy double shaft stripping-plate machine.

The U. S. Molding Machine Co., Cleveland, also has developed a jolt-squeeze machine adaptable to shell work, and included it as a feature of its extensive molding-machine exhibit. Other machines which are in operation in the space allotted to this company include a plain air-jolt machine, a jolt and squeeze machine, a jolt, squeeze and pattern-drawing machine and a plain air squeezer. These machines were shown in operation.

A machine which has been for two years in daily operation at the foundry of the Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., was borrowed by its manufacturers, the Tabor Mfg. Co., Philadelphia, and is shown in operation on the floor of the machinery hall. This machine, which is of the combination shockless jar-ramming roll-over and pattern-drawing type, has been used for the production of radiator tops and parts for automobiles.

The Arcade Mfg. Co., Freeport, Ill., displayed its latest type combination jolt, squeeze and pattern-drawing machine equipped with a plate for special work and a wide range of the castings produced from molds made on this machine. These castings included complex plumbing parts in brass and a number of small gray-iron castings such as gas-engine pistons. Other machines shown by this company were air squeezers, combination jolt and squeeze and plain jolt machines. A hand-operated pouring device was also exhibited.

Saving manpower finds its ultimate interpretation in the exhibit of E. J. Woodison Co., Detroit. A skilled woman operator was employed during the exhibition making cores on a special automatic coremaking machine built by this company. It is stated that women working with this machine in one of the large automobile plants in Detroit, today are doubling

the production of cylinder cores attained by men coremakers previous to the war. Other machines shown by this company included electrically-driven, jar-ramming, roll-over pattern-drawing machines, air squeezers and universal sensitive core machines for making duplicate cores. An exemplification of the company's trade name was carried in a model of its plant, complete to the smallest detail and made from cores in which this company's core binder was used. A line of foundry, plating and polishing supplies also was shown.

The head-room clearance of the machinery hall, where the operating machines were placed was taxed by some of the larger roll-over machines which have been developed recently. Machines which customarily may be built with a pit foundation, by reason of the concrete floor of the exhibition hall, were placed all above floor level. The Dayton Molding Machine Co. was able to set up and place in operation a 28-inch jolt rock-over pattern-drawing machine, with a 12-inch draw. The other machines shown by this company were a 12-inch jolt squeezer, and a 16 x 16-inch jolt-squeeze pattern-drawing machine. These also were in operation.

The Grimes Molding Machine Co., Detroit, demonstrated the operation of a jar-ramming roll-over molding machine a hand ramming roll-over molding machine and a small core-making machine. These machines have all been developed with a view to operation by women. Additional rigidity and improved valve action are points of improvement over older designs.

The Federal Foundry Supply Co., Cleveland, had an extensive display of small molding machines, pattern-drawing machines, vibrators, both electric and air, snap flasks, chaplets and flask trimmings. Plumbago and steel cement for repairing small blow holes also were shown.

The Davenport Machine & Foundry Co., Davenport, Iowa, had in operation a large jolt rock-over machine, a core jolt machine and two types of squeezers.

Other exhibitors of molding machines in many cases combined a wide range of miscellaneous equipment used in the foundry. The Brown Specialty Machinery Co., Chicago, presented three types of machines for making cores from ⅜ to 7 inches in diameter. This company also exhibited an 84-inch table rotary sand-blast machine, which was geared to a motor and revolved to demonstrate its operation, and a pneumatic charging truck for malleable iron annealing ovens.

Among other exhibitors of molding machines whose products were shown either by machines in actual operation or by photographs were: Champion Foundry Machine Co., Chicago; Berkshire Mfg. Co., Cleveland; Herman Pneumatic Machine Co., Pittsburgh; Mumford Molding Machine Co., Chicago; American Molding Machine Co., Terre Haute, Ind.; Wm. H. Nicholls Co., Inc., Brooklyn, N. Y.; International Molding Machine Co., Chicago; Foundry Appliance Co., Newark, N. J.; Foundrymen's Supply Co., Milwaukee; and Freeman Mfg. Co., Racine, Wis.

A CORNER IN THE MAIN HALL SHOWING EXHIBITS OF SAND-BLAST APPARATUS, SCALES AND NONFERROUS METALS.

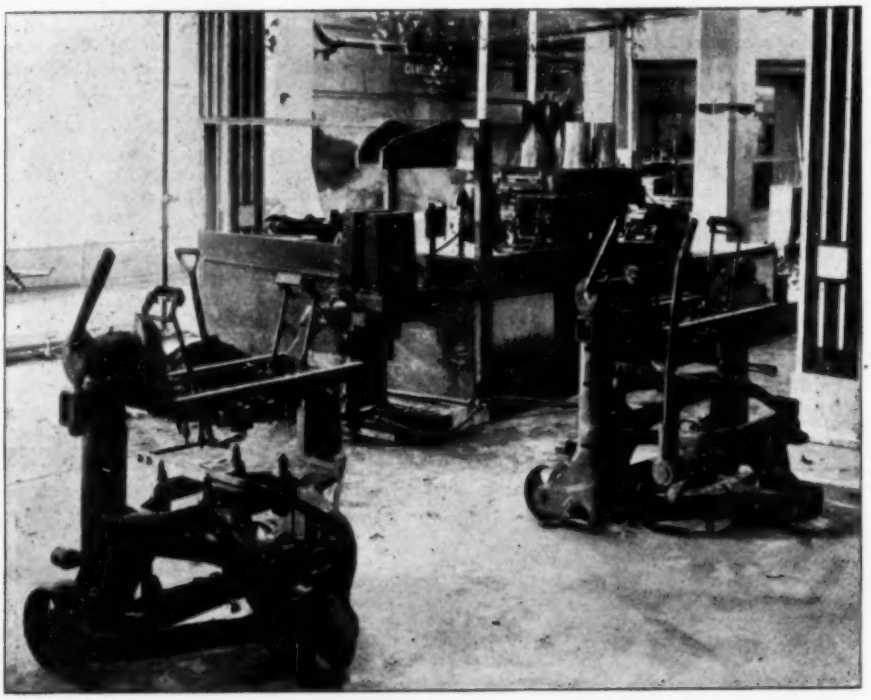
Sand-Blasting Ascendant

Probably no single angle of foundry practice has received more intimate study during the past year than cleaning-room operation. Economy of time and labor, forced by the shortage of both of these factors, previously expended without stint, have served to develop sand-blasting most rapidly. The small foundry no longer can afford to disregard the questions of time and cost with reference to castings after they come from the mold, and the wide range of sand blast equipment shown at the Milwaukee machinery show included much that was adaptable to the ordinary foundry.

One entire corner of the machinery hall was occupied by a single exhibit prepared by the Pangborn Corp., Hagerstown, Md. One operating installation shown was a table-cabinet type sand-blast with direct standard pressure hose machine with a screw conveyor beneath the platform from the cabinet to the sand separator and a bucket elevator. This equipment was capable of handling a wide range of miscellaneous work. Another type shown was a self-contained, sight-feed, stationary nozzle suction cabinet. A third installation demonstrated a suction cabinet sand-blast which was self contained, with a supported movable nozzle adjustable in every direction. Yet another type was an automatic self-contained sight feed suction cabinet sand-blast which is particularly adapted to shell work.

The W. W. Sly Mfg. Co., Cleveland, had on display in the arena of the auditorium a large horizontal sand-blast mill, together with a number of photographs of installations of sand-blast machinery and other cleaning room devices manufactured by this company. Other exhibitors of cleaning room and sand-blast machinery included: McLeod Co., Cincinnati; New Haven Sand-Blast Co., New Haven, Conn.; W. F. Stodder, Syracuse, N. Y.; Hoevel Mfg. Corp., New York; and American Foundry Equipment Co., New York.

In line with the single lump of sugar in the breakfast cup of coffee, modern sand and its binding medium require thorough mixing. Mere perfunctory hand stirring will not produce the results sought. To demonstrate that the ideal condition of perfect



ONE OF THE MOLDING-MACHINE EXHIBITS WITH SPECIALLY RIGGED CORE MACHINE IN THE BACKGROUND.

coating of every grain of sand is approached in its mixer, the Blystone Mfg. Co., Cambridge Springs, Pa., had in operation a 7-cubic foot motor driven core sand mixer into which was delivered sands of two colors. The blending of these colors in the progress of the sand through the machine indicated the state of the mixture.

The National Engineering Co., Chicago, had in operation a sand mixer of the type which it manufactures. This mixer was equipped for electric drive, but is readily adaptable to belt, shaft or gear drive. Photographs of a bucket loader, a continuous core reducer, a screen separator and other foundry equipment, also were shown.

The Sand-Mixing Machine Co., New York, occupied exhibit space jointly with the American Foundry Equipment Co., New York. The former company demonstrated the operation of a sand cutting machine, while the latter showed a rotary-table sand-blast cabinet.

The Standard Sand & Machine Co., Cleveland, demonstrated in operation a core and facing sand mixer, which was direct motor driven.

Varied types of riddles were exhibited in operation. The Great Western Mfg. Co., Leavenworth, Kans., showed two types of gyratory foundry riddles. The Schroter Engineering Co., Chicago, had in operation a gyratory riddle arranged for the use of electrical power through a lamp socket connection. The Battle Creek Sand Sifter Co., Battle Creek, Mich., displayed air driven, hand and belt driven sand sifters, together with spravers for blacking cores and molds.

A complete working exhibit of models of clamshell and orangepeel buckets, with an electric motor bucket in operation were shown by the Hayward Co., New York. This company also had a wide range of photographs of typical installations.

The Whiting Foundry Equipment Co., Harvey, Ill., showed a diversity of standard foundry essentials. Different types of core ovens, tumbling barrels, worm geared ladles, small air hoists, foundry trucks, turntables and a large collection of photographs comprised this exhibit.

Wartime Conservation Aids

Several types of separators for foundry use formed an important though limited division of the Milkee machinery show. The Magnetic Mfg. Co., Milwaukee, showed a magnetic separator for use in either iron, steel or malleable foundries. This separator is provided with an elevator by means of which material is conveyed up and dumped into a hopper. The iron is extracted and any coke, slag or hard lumps are discharged into a separate receptacle. Other equipment shown included two pulley type separators suitable for use in iron, steel or brass foundries. Two brass separators completed the exhibit.

Dings Magnetic Separator Co., Milwaukee, had a number of types of equipment in operation. These included a machine with a motor-generator set, another with a large diameter magnetic pulley, and yet another which is adapted particularly for use in smelting and refining works. The separator equipped with a motor is used in gray iron, steel and malleable foundries for removing iron ordinarily wasted on the dump.

The Deister Concentrator Co., Ft. Wayne, Ind., exhibited a laboratory size diagonal-deck table designed for the treatment of foundry residue.

Air pressure was delivered to all exhibition spaces where it was desired. Pipe lines were run overhead and connections were cut in to provide for the operating lines of molding machines, sand-blasts and pneumatic machinery of every class. The compressor was supplied by the Sullivan Machinery Co., Chicago. This compressor was a compound belt-driven machine with a rated capacity of 445 cubic feet per minute against a pressure of 100 pounds per square inch. It was driven by a 75-horsepower General Electric motor. New features incorporated in the compressor include plate valves which are used in both the high and low pressure cylinders for both inlet and exhaust.

Machines to Replace Soldiers

The shortage of manpower in foundries and machine shops has led all shop executives to make a closer study of the possibilities of performing with mechanical equipment and fewer men, the work formerly done by larger gangs of workmen. In no other line probably has this study revealed larger opportunities than in the field of handling equipment. For that reason particular interest was taken by the visitors to the exhibition in such displays.

Indicative of this change in modern methods of handling materials in the foundry were the exhibits revealing the extent to which roller bearings are now being applied to foundry equipment. The Hyatt Roller Bearing Co., New York, had a complete display which included roller-bearing I-beam trolleys; countershaft bearings; two small test cars, one equipped with roller bearings and one with plain bearings, mounted on a T-rail to demonstrate the easy running qualities of cars equipped with roller bearings; an industrial truck wheel showing how roller bearings are applied to a truck; roller bearings mounted in glass tubing and revolved by an electric motor to demonstrate the oil-distributing function of this bearing; and a small model of a steel-mill roller-table equipped with roller bearings in self-aligned housings.

The Norma Co. of America, New York, exhibited various types of ball and roller bearings, illustrations being shown to indicate the application of these bearings to different kinds of machinery.

The Abell-Howe Co., Chicago, revealed in its exhibit the extent to which trucks can be employed in foundry operations. The trucks displayed were arranged for hand trucking or for use with power tractors as trailers. Moving pictures and photographs were employed to illustrate the applications of these trucks to foundry transportation problems. An electric hoist also was displayed.

Welding and Cutting Apparatus

Evidence of the rapid progress made during the past 12 months in the development and application of welding and cutting apparatus was furnished by the exhibits devoted to this line of equipment. These displays included not only apparatus for use in foundry cleaning rooms but for general repair work. In most cases, actual demonstrations of the process of welding or cutting were given.

The Davis-Bournonville Co., Jersey City, N. J., showed an unusually interesting series of apparatus for cuttin and welding work. Included

among these was a machine for cutting steel plate from 1 to 15 inches or more in thickness, according to drawing or pattern. The machine follows the pantagraph principle. A motor-propelled tracing wheel is employed which follows the lines of the drawing, which in turn are reproduced with the cutting torch. Either the oxyacetylene or oxyhydrogen cutting flame may be employed. A small motor drives the tracing wheel and is the only power required. Other machines were for handling both light and heavy cuts in steel up to 18 inches in thickness and for cutting circles. Welding units also were exhibited.

A gas generator was displayed by the Oxweld Acetylene Co., Chicago. This unit has an hourly capacity of 50 cubic feet and the gas was used in cutting and welding various iron and steel articles. Welding and cutting torches, tips, etc., also were shown. In addition, a working exhibit was presented of the apparatus manufactured by the Prest-O-Lite Co., Indianapolis.

The Metal & Thermit Corp., New York, included in its exhibit a large weld made on a crankshaft by the thermit process.

An oxyacetylene torch which is adapted for both cutting and welding, combining the two operations in a single unit, was displayed by the Alexander Milburn Co., Baltimore. A high pressure acetylene generator also was shown, this machine carrying a 10 per cent overload and being designed to eliminate undue heating on standard charges of carbide. Portable carbide lights formed a part of the display.

The Air Reduction Sales Co., New York, exhibited oxyacetylene cutting apparatus and generators. Practical demonstrations were given. Other exhibitors of this type of equipment for cutting and welding included the Bastian-Blessing Co., Chicago; the Arcwell Corp., New York, and the Torchweld Equipment Co., Chicago.

An interesting exhibit was made by the American Gum Products Co., New York. It consisted of cores made with the binder manufactured by this company. These cores included one for a 4-cylinder motor made with a 110 to 1 mixture, one for a large valve and one for the compression head for an ice machine. All exhibitors of core compounds displayed cores or castings in which their products were employed.

The S. Obermayer Co., Chicago, exhibited core ovens of both the portable and stationary type. In addition, this exhibit included sprue cutters, rosin mills, one being of the outside feed type, tumbling barrels and miscellaneous equipment and supplies.

Core ovens of both the car and drawer types were displayed by a number of companies. The G. S. Blodgett Co., Burlington, Vt., exhibited two types of portable ovens. The Young Brothers Co., Detroit, showed the front half of an 8 x 12-foot oven, with electric heaters, automatic temperature control, control panel and recording thermometer. An arrangement for firing ovens by oil or coke furnaces below the floor level was shown.

The Wadsworth Core Machine & Equipment Co., Akron, O., had an interesting display of coremaking machines and coreroom equipment. This included a motor-driven, self-contained coremaking machine, a core cutting-off coning machine as well as steel reinforced core and bottom plates.

Melting Equipment

Furnaces of many different types, designed for a wide variety of uses, were on display. The Hausfeld Co., Harrison, O., exhibited an open flame, noncrucible furnace, a crucible tilting furnace and a tilting aluminum furnace with a 100-pound iron pot. The Ludlum Electric Furnace Corp., Chicago, and the Pittsburgh Furnace Co., Milwaukee, exhibited their types of electric furnaces by model and photographs. The Monarch Engineering & Mfg. Co., Baltimore; the Buckeye Products Co., Cincinnati; and the Mahr Mfg. Co., Minneapolis, exhibited melting furnaces. The Buckeye company also displayed burners, vibrators, parting compounds, core compounds and other types of foundry supplies. The Mahr company displayed oil burning torches, ladle heaters, burners, forges and driers.

Wood and Metal Working Tools

A certain number of power tools, usually placed in the pattern shop, always have been part of the equipment of a well organized foundry. But today, that foundry which is preparing to engage in the production of cast shells receives a higher rating in the eyes of the ordnance department if metal working machine tools are at hand and available. The machine tools displayed at the Milwaukee convention indicated a strong tendency in the direction of machine shops as an adjunct to the complete foundry. Sanders, wood millers, wood turning lathes, shapers and band saws divided honors on the exhibit floors with similar machine tools for use in metal working.

Milwaukee is the home of two well known manufacturers of milling machines, and both of these companies had exceptionally attractive displays. One of these firms, the Kempsmith Mfg. Co., had three horizontal milling machines in operation upon standard work. The other, Kearney & Trecker Co., had a vertical and a horizontal machine connected up to motors and operating upon standard work from its own shop.

The Warner & Swasey Co., Cleveland, exhibited in operation a universal motor-driven turret screw machine operating on chuck work and a universal hollow hexagon motor-driven turret lathe operating on bar work.

The Modern Tool Co., Erie, Pa., had on exhibit a self-contained plain grinding machine in operation, and a range of accessories including self-opening and adjustable screw-cutting die heads, adjustable collapsible taps, solid dies, adjustable hollow milling tools, chuck and collet equipment and tapping appurtenances.

The Racine Tool & Machine Co. had in operation several high speed metal cutting machines of a new type. These machines operate on the principle of a reciprocating horizontal saw.

The Oliver Machinery Co., Grand Rapids, Mich., had an extensive display of patternmaking machinery including a universal wood milling machine, a universal saw bench; a 30-inch disc and spindle sander and an 18-inch x 8-foot tool-room engine-lathe with attachments. Other equipment shown included a patternmaker's bench, hand planers and jointers and an embossing press for lettering patterns.

The Norton Co., Worcester, Mass., displayed a complete line of grinding wheels especially adapted for foundry use, together with others used in machine tool work. In addition refractory materials and rubbing bricks also were exhibited. A 2-inch floor grinder and a 1-inch bench grinder were shown in operation.

The Acme Machine Tool Co., Cincinnati, had in operation a universal flat turret lathe capable of handling work up to 17 inches with a swing over carriage of 17 inches and over bed of 24 inches.

The Cleveland Pneumatic Tool Co., Cleveland, made an elaborate display of air tools, including drills, sand rammers, core breakers, chipping hammers, riveting hammers, emery grinders, air hose couplings, valves and fittings, hose clamps and air hose.

Simonds Mfg. Co., Fitchburg, Mass., displayed a line of metal cutting saws, files and hack-saw blades, and demonstrated some of its saws in operation on a machine built by the Greenfield Tap & Die Corp., Greenfield, Mass.

Pig Iron and Coke

Rogers, Brown & Co., Cincinnati, displayed different types of castings, all of which enter into government work. One was the radiator for a truck, and others were for ordnance and ship work.

Pickands, Brown & Co., Chicago, had an unusual display. An officers' tent at headquarters was constructed entirely from by-product coke. Foundry coke was used for the front, back and sides and crushed sizes for the roof.

Semisteel castings of light section, such as automobile cylinders containing from 20 to 50 per cent steel, were displayed by McLain's System, Inc., Milwaukee. These castings were made by graduates of this school. The McLain-Carter Furnace Co., Milwaukee, exhibited open-hearth castings poured from metals made in this type of oil-fired furnace.

The Locke Pattern Works, Detroit, displayed a complete set of metal pattern equipment for making a 155-millimeter howitzer shell. Mahogany patterns for government trucks and cast and aluminum plates for small parts of government tractors were also shown.

The Allis-Chalmers Mfg. Co., Milwaukee, displayed a wide line of power plant equipment. This included an 18,000 foot-pound, automatic oil pressure governor for controlling the speed of hydraulic turbines. This unit is designed for remote control so that two or more can quickly be placed in synchronism. Other equipment displayed included a 50 cubic foot air compressor, a 6-inch centrifugal pump and models of large turbine runners.

(*Concluded on Page* 856)

Pig Iron Production First Half of 1918

Compiled by American Iron and Steel Institute

HALF-YEARLY PRODUCTION OF ALL KINDS OF PIG IRON.

States.	Blast furnaces. In blast Dec. 31 1917.	June 30, 1918. In.	Out.	Total.	Production—Gross tons. (Includes spiegeleisen, ferro-mang., ferro-silicon, ferro-phosphorus, etc.) First half of 1917.	Second half of 1917.	First half of 1918.
Massachusetts	1	1	1	2	4,305	6,222	5,470
Connecticut	2	2	1	3			
New York	21	24	2	26	1,118,482	1,299,045	1,339,472
New Jersey	5	4	1	5			
Pennsylvania	122	137	25	162	7,790,514	7,749,214	7,121,903
Maryland	2	4	1	5	234,589	187,623	174,408
Virginia	15	13	6	19	231,937	288,374	263,676
Alabama	34	31	15	46	1,494,479	1,459,226	1,286,571
Georgia	1	0	4	4			
Texas	0	0	2	2			
West Virginia	3	3	1	4	282,548	279,403	264,151
Kentucky	4	5	2	7			
Mississippi	0	0	1	1			
Tennessee	10	12	4	16	201,296	168,655	189,978
Ohio	64	71	7	78	4,269,708	4,248,895	4,059,603
Illinois	17	24	1	25	1,810,137	1,646,778	1,505,113
Indiana	13	15	0	15	1,200,122	1,457,381	1,402,667
Michigan	12	11	3	14			
Wisconsin	5	4	4	8	392,864	345,677	368,469
Minnesota	3	3	0	3			
Missouri	2	2	0	2			
Iowa	0	0	0	0			
Colorado	3	4	2	6	227,254	226,488	246,249
Oregon	0	0	1	1			
Washington	0	1	0	1			
California	0	0	0	0			
Total	339	371	84	455	19,258,235	19,362,981	18,227,730

HALF-YEARLY PRODUCTION OF COKE PIG IRON.*

New York	21	24	1	25	1,117,918	1,294,237	1,334,792
New Jersey	4	4	0	4			
Pennsylvania	107	127	17	144	7,586,452	7,575,164	7,005,488
Maryland	2	3	1	4	234,589	187,523	174,208
Virginia	15	13	4	17			
Georgia	1	0	2	2	231,937	294,888	264,396
Texas	0	0	1	1			
Alabama	32	30	14	44	1,475,063	1,438,778	1,273,905
West Virginia	3	3	1	4	282,548	272,889	263,431
Kentucky	4	5	2	7			
Tennessee	9	11	4	15	200,874	166,294	189,852
Ohio	64	71	7	78	4,269,708	4,248,895	4,059,603
Illinois	17	24	1	25	1,810,137	1,646,778	1,505,113
Indiana	13	15	0	15			
Michigan	3	3	0	3	1,263,426	1,474,980	1,430,080
Wisconsin	4	3	3	6			
Minnesota	3	3	0	3			
Missouri	1	1	0	1			
Iowa	0	0	0	0			
Colorado	3	4	2	6	402,028	388,537	433,064
Washington	0	1	0	1			
Oregon	0	0	1	1			
California	0	0	0	0			
Total	306	345	61	406	18,874,680	18,988,963	17,933,932

*Includes ferro-alloys made with electricity.

ANTHRACITE AND MIXED ANTHRACITE AND COKE PIG IRON.

New Jersey	1	0	1	1	203,320	177,728	120,404
Pennsylvania	14	9	4	13			
Total	15	9	5	14	203,320	177,728	120,404

HALF-YEARLY PRODUCTION OF CHARCOAL PIG IRON.

Massachusetts	1	1	1	2	4,305	6,222	5,470
Connecticut	2	2	1	3			
New York	0	0	1	1	1,306	1,130	691
Pennsylvania	1	1	4	5			
Maryland	0	1	0	1			
Virginia	0	0	2	2	19,416	*20,548	12,866
Alabama	2	1	1	2			
Georgia	0	0	2	2			
Texas	0	0	1	1			
Tennessee	1	1	0	1	422	2,361	126
Mississippi	0	0	1	1			
Michigan	9	8	3	11	124,618	133,633	124,209
Wisconsin	1	1	1	2	30,168	*32,396	30,032
Missouri	1	1	0	1			
Total	18	17	18	35	180,235	*196,290	173,394

*Includes a small tonnage made with charcoal and coke.

TOTAL PRODUCTION OF PIG IRON ACCORDING TO FUEL USED.

Coke*	306	345	61	406	18,874,680	18,988,963	17,933,932
Anthracite†	15	9	5	14	203,320	177,728	120,404
Charcoal‡	18	17	18	35	180,235	196,290	173,394
Total	339	371	84	455	19,258,235	19,362,981	18,227,730

*Includes ferro-alloys made with electricity.
†Includes mixed anthracite and coke pig iron.
‡Includes small tonnage made with charcoal and coke.

HALF-YEARLY PRODUCTION OF BASIC PIG IRON.

States.	First half of 1917.	Second half of 1917.	First half of 1918.
New York, New Jersey	535,286	627,367	658,750
Pennsylvania—Allegheny County	1,797,309	1,901,228	1,694,024
" —Other counties	2,330,237	2,320,621	2,157,676
Virginia, Alabama, Kentucky	770,667	748,795	625,019
Ohio	1,412,324	1,575,056	1,544,630
Indiana, Illinois	1,466,677	1,610,138	1,617,829
Michigan, Minn., Missouri, Col., Wash.	308,104	267,853	319,764
Total	8,620,604	9,051,058	8,617,692

HALF-YEARLY PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON.

New York, New Jersey	224,345	254,484	193,063
Pennsylvania	2,943,671	2,741,346	2,603,066
Maryland	214,652	175,916	170,153
West Virginia, Kentucky, Tenn., Ala.	249,427	238,082	201,726
Ohio	2,235,910	2,074,864	1,897,869
Illinois, Wisconsin, Minnesota, Colorado	1,173,421	1,188,614	940,730
Total	7,041,426	6,673,306	6,006,607

HALF-YEARLY PRODUCTION OF FOUNDRY PIG IRON AND FERRO-SILICON.

Massachusetts, Connecticut	4,305	6,222	5,410
New York, New Jersey	271,555	316,934	380,391
Pennsylvania	417,088	519,882	340,499
Maryland, Virginia, West Virginia	236,549	285,142	256,389
Georgia, Kentucky	29,617	*33,240	27,957
Tennessee	187,068	148,097	171,409
Alabama	701,886	659,965	592,581
Ohio	330,402	321,009	327,570
Indiana, Illinois	58,844	32,129	26,281
Michigan	176,142	198,853	178,781
Wisconsin	143,258	129,487	140,548
Minnesota, Missouri, Iowa, Colorado, Cal.	45,734	74,850	70,905
Total	2,602,448	2,725,810	2,518,721

HALF-YEARLY PRODUCTION OF MALLEABLE PIG IRON.

New York, New Jersey	77,806	71,569	80,745
Pennsylvania	38,176	38,051	62,797
Ohio	205,098	225,318	212,567
Alabama, Illinois, Michigan, Wis., Mo.	188,902	170,659	251,209
Total	509,982	505,597	607,318

HALF-YEARLY PRODUCTION OF FORGE PIG IRON.

New Jersey	3,607	2,822	7,629
Pennsylvania	98,910	47,749	74,457
Virginia	2,147	354	0
Tennessee	1,643	1,580	1,213
Alabama	17,156	41,724	42,021
Ohio	75,451	52,564	72,316
Total	198,914	146,793	197,636

HALF-YEARLY PRODUCTION OF SPIEGELEISEN AND FERRO-MANGANESE.

New York, New Jersey, Penna., Maryland, Virginia, Alabama, Illinois, Colorado, Washington, Cal.	210,432	242,678	*237,228
Total	210,432	242,678	*237,228

*152,051 gross tons of ferro-manganese and 85,177 tons of spiegeleisen.

HALF-YEARLY PRODUCTION OF OTHER GRADES.

Conn., New York, New Jersey	3,388	15,522	8,076
Pennsylvania	8,803	9,819	9,431
Md., Va., West Va., Tenn., Ga., Ala.	13,164	23,359	17,009
Ohio	10,523	84	4,651
Indiana, Ill., Mich., Wis., Minn. Mo., Col., Wash., Cal.	38,551	*31,045	3,361
Total	74,429	17,739	42,528

*Credit; due to change in grade.

PIG IRON MADE FOR SALE OR FOR USE OF MAKERS IN THE FIRST HALF OF 1918.

Grades.	For sale.	For maker's use.	Total. Gross tons.
Basic	1,164,020	7,453,672	8,617,692
Bessemer and low-phosphorus	799,482	5,207,125	6,006,607
Foundry, including ferro-silicon	2,458,412	60,309	2,518,721
Malleable	563,279	44,039	607,318
Forge or mill	80,442	117,194	197,636
Ferro-manganese	67,659	84,392	152,051
Spiegeleisen	68,549	16,628	85,177
All other grades	24,402	18,126	42,528
Total	5,226,245	13,001,485	18,227,730

Two Millions

Represent Pig Iron Loss For Year In First Half Figures

If pig iron production in the last half of the year is continued at the same rate as in the first half, the loss in production in 1918, compared with 1917, will be approximately 2,170,000 tons. Owing to the fact that several large new furnaces have been put in blast recently and others are building, it is probable that, despite unfavorable weather conditions, this loss will be largely recovered in the last six months. The advance statistical bulletin of the American Iron and Steel institute places the total output of pig iron, including ferroalloys made in electric furnaces and the product of the charcoal furnaces, at 18,227,730 tons for the six-month period ending June 30, 1918. This is a loss of 1,135,251 tons, compared with the last half of 1917, with a production of 19,362,981 tons, and 1,030,505 tons compared with the first half, when 19,258,235 tons were produced.

Figures showing production according to fuels used indicate a relatively greater loss for the anthracite furnaces than for the coke furnaces. Blast furnaces operated on coke made 17,933,932 tons of pig iron, while in 1917, the tonnages were 18,988,963 and 18,874,680 tons, respectively, for the last and the first-half periods. This shows a falling off in production of 1,055,031 tons compared with the previous six months and 940,748 tons compared with the January-June, 1917 total. The anthracite furnace output was only 120,404 tons, compared with 177,728 tons in the previous six months, a loss of 57,324 tons, and with 203,320 tons in the first half, a loss of 82,916 tons.

The output of charcoal furnaces amounted to 173,394 tons, which is 22,896 tons less than the total for the last half of 1917, and 6841 tons below the total for the first half of the same year.

The production of basic pig iron in the first six months of the current year totaled 8,617,692 tons. This is only 2912 tons below the figure for a similar period in 1917, but shows a loss of 433,366 tons compared with the six months ending Dec. 31, 1917. Statistics on bessemer and low phosphorus pig iron show that 6,006,607 tons were made in the first half of this year, 6,673,306 tons in the last half of 1917 and 7,041,426 tons in that first half of 1917, indicating losses of 666,699 and 1,034,819 tons, respectively. Declines are also noted in foundry and ferrosilicon and forge pig iron. Malleable shows a slight increase compared with the previous six months, but a loss compared with the first half of 1917.

Of the total production 5,226,245 tons were for sale, and 13,001,485 tons were for use of the makers.

Further Price Corrections Officially Put Out

Further corrections to the price recommendations made by the American Iron and Steel institute under date of Sept. 26, which are in addition to those published on page 772 of the Oct. 3 issue of THE IRON TRADE REVIEW, have been announced by the institute. Chairman Gary, in announcing these corrections says:

Referring to my statement dated Sept. 26, 1918, concerning certain changes and modifications in maximum prices, differentials, extras, etc., as heretofore recommended by the institute, it has been found that under the prices and differentials recommended to supersede those shown on page 38 of the institute pamphlet of August, 1918 (page 18 IRON TRADE REVIEW booklet), the proper differential for foundry iron with silicon 1.00 to 1.75 was omitted. To correct this omission, please add the following as the first item to the table of silicon differentials for foundry iron:

"Silicon 1.00 to 1.75 * * * $0.50 under base."

In the warehouse schedule there have been some further corrections. On Merchant Steel Boiler Tubes, Lap-welded-Steel, a plus sign is put in front of all discounts on sizes 1¾ inch to 2 inch outside diameter; and under the San Francisco prices a plus sign is put in front of the 8 per cent discount for the 2¼ inch outside diameter and in front of the 10 per cent discount for 2½ inch to 3¼ inch outside diameter.

The price of plates at San Francisco is changed from $4.50 to $5.50.

In front of all discounts on cold-rolled steel a plus sign is to be inserted to indicate that the discount shown is to be added to full list price instead of deducted from it. Judge Gary's statement further says:

"All warehouse prices will vary with changes in freight rates, and revised prices due to such changes will be effective on and after effective date of new freight rates."

Basing Points

In Fixing Pig Iron Prices Shown By Typical Examples

How the new basing points of Pittsburgh and Birmingham on pig iron made in certain districts by virtue of the President's announcement effective Oct. 1, shall apply is explained in detail in a letter sent to producers by the subcommittee on pig iron, iron ore and lake transportation of the American Iron & Steel institute. The typical cases of individual Tennessee, Virginia and eastern furnaces are illustrated by carrying through the application to definite destinations.

The committee's letter to the producers is as follows:

Gentlemen:

At the request of some furnace companies we are issuing this letter with a view of assisting pig iron manufacturers to a correct understanding of the double basing point plan incorporated in the revision of prices fixed by the war industries board and approved by President Wilson, and effective Oct. 1, 1918.

The following will assist you in determining the base price at your furnace for quotations in various localities, which base price will be subject to variation by the differentials provided for different grades of iron.

"A"—Pig iron produced in the Virginia, Tennessee and Birmingham districts and the scattering districts south of the Ohio and Potomac rivers, including furnaces at St. Louis, Mo., but not including furnaces bordering on the Ohio river, shall be sold on an f.o.b. Birmingham, Ala., basis.

ILLUSTRATION:

FOR A TENNESSEE PRODUCER

Base	$34.00
Birmingham to Dayton, O., rate	4.20
Price delivered f.o.b. Dayton, O.	$38.20
LaFollette to Dayton, O., rate	2.90
Price f.o.b. LaFollette	$35.30

FOR A VIRGINIA PRODUCER

Base	$34.00
Birmingham to Baltimore, Md., rate	5.60
Price delivered f.o.b. Baltimore Md.	39.60
Pulaski to Baltimore, Md., rate	3.30
Price f.o.b. Pulaski	$36.30

"B"—Pig iron produced in the eastern districts, i. e., from blast furnaces located east of the Allegheny mountains and north of the Potomac river, shall be sold on an f.o.b. Pittsburgh basis.

ILLUSTRATION:

FOR AN EASTERN FURNACE PRODUCER

Base	$34.00
Pittsburgh to Chester, Pa., rate	3.60
Price delivered f.o.b. Chester, Pa.	37.60
Catasauqua, Pa. to Chester, Pa., rate	1.60
Price f.o.b. Catsauqua, Pa., rate	$36.00

The f.o.b. Birmingham and Pittsburgh basis for pig iron does not apply to either charcoal or low phosphorus iron. Prices for these irons continue to be f.o.b. furnace basis as heretofore, no matter where the furnace producing them is located.

Pig iron from all other producing districts or furnaces shall be sold f.o.b. furnace basis as heretofore.

All differentials to be figured on the base price for No. 2 foundry iron, $34 per gross ton f.o.b. cars furnace; except the silicon differentials for bessemer iron, which are to be added to the base price of bessemer iron not over 3 per cent silicon.

A complete list of differentials corrected to October 1, 1918, and in effect from that date is published in *Iron Age* and IRON TRADE REVIEW issues of Sept. 26, 1918.

Very truly yours,
H. G. Dalton,
Chairman, Pig Iron, Iron Ore and Lake Transportation Subcommittee.

P. S.—In the official announcement the differential for foundry iron, silicon 1.00 to 1.75, was omitted. This differential, as heretofore, is to be 50 cents per ton under the base price for No. 2 foundry iron.

A new department opened up by the Hughes Mfg. Co., Rome, N. Y., necessitates the purchase of arbors, lathe chucks, twist drills, files and rasps, solid and expanding reamers and mandrels from ¼-inch up, hand and power hack saw blades, tool holders, friction clutch pulleys, post hangers, drilling machine and bench vises, lathe dogs, etc. Catalogs and prices are requested.

Industry Responds to Liberty Loan

Fourth Call from Uncle Sam for $6,000,000,000 Meets With Enthusiastic Reception from Employer and Employed—Iron, Steel and Allied Trades Strive Vigorously to Make 100 Per Cent Records

As a swimmer fills his lungs prior to the plunge which is to break all previous records, so the nation drew in its breath when Secretary of the Treasury McAdoo announced that the fourth Liberty loan would call for a minimum of $6,000,000,000. Accustomed as the country has become to huge sums in connection with war expenditures, it found it difficult to visualize a sum which is equivalent to $5.95½ for each minute in 1918 years, or approximately $6 for every minute from the dawn of the Christian era until the present time. None could grasp the meaning of an amount which in one-dollar bills, laid end to end, would circle the earth about 30 times at the equator or which in silver dollars would make a stack approximately 8875 miles high. It took the necessary deep breath, however, and dug in to "carry on" to a successful conclusion the campaign for dollars, which is to help end the campaign for peace.

Solicitation machinery which worked haltingly and with many set-backs because of its newness in the first loan, has operated much more smoothly with each successive application. Now, with completed organizations, profiting by previous experiences, the various districts are rolling up their quotas, industrial firms are sending in their usual liberal contributions and the workpeople are doing more than their share.

With a casualty list of two or three hundred names every day to read, the American people are finding it unnecessary to be plead with to buy bonds to finance a just war. Reports are being filed in all districts of the country which presage not alone that the goal set will be reached but that there will be as large an over-subscription to this fourth loan as was rolled up for the previous three. Small attention is being paid to the peace whines of the enemy.

As usual the iron and steel industry forges to the front with splendid records. Operatives in these trades are among the first to subscribe and in many cases oversubscribe their quotas. War-time salaries have resulted in large subscriptions from workmen in mills. It is stated that each of the 22 rollers in the plant of the DeForest Sheet & Tin Plate Co., Niles, O., subscribed for $1000 worth of bonds of the fourth issue. Other employes in that plant bought accordingly, some $500 worth and some less.

A performance similar to those of past loans is being given by other plants and their workmen in the Youngstown district. The United Engineering & Foundry Co. of that city has bought $1,200,000 of the new issue, which is equivalent to about 16 per cent of its capitalization. Up to Oct. 3, Youngstown district corporations had subscribed $3,042,000, which since has been materially increased. Workmen are doing their full share. It appears that the allied successes in France, the Balkans and Palestine are having an effect upon the alien workmen and greatly increased subscriptions are the result. On the first day of the campaign employes of the Republic Iron & Steel Co., who have pledged themselves to double their third loan subscriptions, bought $612,000 worth of bonds, while their subscriptions at the end of the third campaign totalled only $747,000. A similar record was made by the men at the Carnegie Steel Co. Youngstown plant, who bought $360,000 the first day, against $600,000 in the third drive. With many alien-born workmen in the yard labor department of the Youngstown Sheet & Tube Co., this department averaged $418 per man. Day workmen in the bessemer department blooming mill bought $5000 more bonds the first day of the canvass than were purchased by both day and night men together in the third loan. It is expected that the total of $3,500,000 subscribed by industrial operatives in the third loan will be exceeded by about $4,000,000 in this. Youngstown expects to go $11,000,000 over its quota.

Cleveland to be 100 *Per Cent*

Among the large subscriptions received in Cleveland are the following: The American Ship Building Co., $1,100,000; the Cleveland-Cliffs Iron Co., $1,050,000, and the White Motor Co., $1,000,000. Some of the companies to go over the top with 100 per cent subscriptions during the first two or three days of the campaign were: The Cleveland Metal Products Co., with $200,000; the Steel Products Co., $50,000; the Chandler Motor Car Co., $300,000; the Torbenson Axle Co., $20,000; the Cuyahoga Stamping Co., $36,000, and the Eberhard Mfg. Co., $100,000.

Metal working concerns in Chicago have come through with 100 per cent subscriptions in gratifying number. At the plant of the Burnside Steel Co., Ninety-second street and Kimbark avenue, each of the 125 employes made a subscription, the total being $12,600. Subscriptions were taken from each of the 338 employes of the Ajax Forge Co., 2503 Blue Island avenue, the total being $50,000. This is a per capita subscription of $148, and is believed to be a record for this class of subscriptions. Joseph T. Ryerson & Sons, steel warehousemen, have made a subscription of $700,000 in the Chicago district, with $200,000 to be credited to branches.

East Chicago, Ind., is in receipt of a cablegram from General Pershing, congratulating the city on being the first in the country to complete its quota. Some large subscriptions have been made in the Chicago territory. The Inland Steel Co., and its employes have subscribed for $1,810,850 worth. Other subscriptions include the American Steel Foundries, $160,000; Standard Forging Co. and employes, $132,000; Whiting Foundry Equipment Co., $100,000 and the American Car & Foundry Co., $100,000.

In Detroit, during the first week of the campaign $43,000,000 of the county's quota of $74,000,000 was subscribed. This included the $7,000,000 subscription of the Ford Motor Co., the Ford shipbuilding and tractor plants and their 47,000 employes. An additional $3,000,000 was subscribed by the Ford company for its 30 branch plants in other cities. Practically 60 per cent of the remaining subscriptions have come and are coming from the metal working industry.

Chicago's total quota among the iron and steel industries is $17,000,000, or nearly double the amount asked in the third loan. In order to properly canvass the field, an organization has been completed. The United States Steel corporation will credit Chicago with a due proportion of its purchases. The Lunkenheimer Co., Cincinnati, has allowed $10,000 to the Chicago committee. S. J. Llewellyn, president of the Interstate Iron & Steel Co., is chairman of the iron and steel section. Vice chairmen of the subdivision are as follows:

Rolling mills—G. H. Jones, Inland Steel Co.

Blast furnaces—R. S. Dutton, Pickands, Brown & Co.

Warehouse steel—Charles Heggie, Scully Steel & Iron Co.

Steel works—C. F. Biggert, Wisconsin Steel Co.

Brass, etc.—Samuel Deutsch, Ohio Iron and Metal Co.

Fabricated steel—Fred A. Ingalls, 332 South Michigan avenue.

Miscellaneous iron and steel—J. T. Llewellyn, 120th and Racine avenue.

Tools, etc.—J. L. Hench, 208 South La Salle street.

United States Steel Corp.—W. J. Totten, Illinois Steel Co.

A challenge has been given by the American expeditionary forces. A message comes to the President that they will willingly contribtue their pay if the fourth Liberty loan is not subscribed. That this country will never suffer the humiliation, disgrace and dishonor of having to appropriate its soldiers' pay checks will be demonstrated when shortly after Oct. 19 the final returns are in from all districts and Secretary McAdoo flashes the word across the Atlantic ocean: "Khaki-clad men of the American army, the stay-at-home army of America is with you, by you and back of you to the finish. It wants you to make a clean-up job. It wants you to make Germany tired of war forever. It wants you back home again. The fourth Liberty loan has not been subscribed, it has been over-subscribed."

August Exports Make Best Showing

Shipments Exceed 500,000 Tons and Month's Record is Largest Since War, Excepting 1916—Pig Iron, Semifinished Material, Rails and Barb Wire Are Big Items—Imports Remain Small

AUGUST made the record for the first eight months of the year in shipment of iron and steel products to foreign countries. Shipments for that month, as reported by the bureau of foreign and domestic commerce, amounted to 512,104 tons, or 17,047 tons above the shipments in January, which previously held the record for the year, and 59,345 tons more than the July total of 452,759 tons. With the exception of 1916, the 1918 figure was the largest August total since the beginning of the war, and exceeded August, 1917, exports by 9029 tons.

Pig iron, semifinished material, steel rails and barbed wire showed substantial increases compared with shipments for the previous month. Exports of pig iron reached a total of 26,028 tons, the best total for the year. Compared with the July shipments of 20,265 tons, this is a gain of 5763 tons, but it is less than half of the tonnage of pig iron exported in August, 1917, when the movement amounted to 62,063 tons. The semifinished material exports reached a total of 189,851 tons in August, 1918, 50,239 tons above the July, 1918, figure of 139,612 tons, and 19,348 tons over the shipments for August a year ago. Barbed wire also showed a substantial increase, the shipments for August and July being, respectively, 35,170 and 27,644 tons, while in August a year ago the tonnage was only 5815. Steel rail exports of 42,542 tons were almost double those for August, 1917, which totaled 22,497 tons, and well above the July, 1918, tonnage of 27,358.

Only 71 tons of scrap were exported, compared with 7041 tons for the previous August and no shipments at all in July of this year. There were slight declines in shipments of pipes and fittings, wire nails and wire rods.

Imports Continue Small

Only 12,520 tons of iron and steel commodities were received in this country during the month of August. This total is, however, 1009 tons above July, with 11,511 tons, but is less than half the August, 1917, tonnage of 26,129. Scrap imports showed some improvement, reaching 3568 tons, a gain of 883 tons compared with the previous month, but only about one-third of the receipts for August a year ago, which amounted to 11,213 tons. Pig iron imports totaled 3910 tons, compared with 4305 tons in July, 1918, and 5790 tons in August, 1917, losses of 395 tons and 1880 tons, respectively.

Iron ore imports for the month of August amounted to 95,892 tons, and for July, the tonnage was 118,875, indicating a loss of 22,983 tons in August. A year ago, however, only 63,571 tons of iron ore were received in this country, showing a gain of 32,321 tons in August, 1918, compared with the same month in 1917. Cuban shipments continue heavy, reaching a total of 82,213 tons, compared with 86,905 in July and 26,802 tons in August, 1917.

EXPORTS, GROSS TONS

1916	Pig iron	Semi-finished material
Jan.	19,319	55,315
Feb.	15,061	87,406
Mar.	19,439	107,675
Apr.	18,518	88,764
May	28,293	142,782
June	48,770	116,316
July	28,718	135,827
Aug.	60,264	160,921
Sept.	64,122	163,104
Oct.	92,756	162,669
Nov.	106,781	120,883
Dec.	105,195	162,901
1917		
Jan.	69,146	183,656
Feb.	49,018	131,566
March	69,629	193,469
April	44,783	162,209
May	61,112	168,158
June	83,406	190,907
July	32,305	166,085
Aug.	62,083	170,503
Sept.	44,287	148,932
Oct.	47,200	204,724
Nov.	25,733	150,120
Dec.	66,573	204,555
1918		
Jan.	20,581	195,385
Feb.	10,540	173,272
March	9,849	144,443
April	11,282	177,128
May	22,567	159,299
June	22,896	139,377
July	20,265	139,612
Aug.	26,028	189,851

IRON AND STEEL EXPORTS, GROSS TONS

	August		Eight months ending August	
	1918	1917	1918	1917
Scrap	71	7,041	1,679	135,102
Pig iron	26,028	62,063	144,179	471,462
Steel billets, ingots and blooms	189,851	170,503	1,311,902	1,305,309
Wire rods	9,581	20,621	95,786	99,644
Steel rails	42,542	22,497	282,270	337,836
Steel bars	47,819	48,809	419,200	423,193
Iron bars	5,707	2,306	33,860	36,461
Struc. iron and steel	20,300	19,418	153,010	201,290
Hoops, bands and scroll	3,988	4,685	35,975	36,616
Sheets and plates	76,405	77,445	553,614	549,912
Tin and terne plate	17,705	15,953	192,168	161,081
Barbed wire	35,170	5,815	144,844	109,910
All other wire	15,544	12,138	102,541	129,047
Cut nails	347	480	2,954	2,416
Wire nails	5,242	10,552	53,684	64,952
All other nails, incl. tacks	1,032	875	7,419	13,025
Pipes and fit'gs	11,080	16,663	106,852	132,758
R. R. spikes	1,007	843	7,029	12,818
Bolts, nuts, rivets and washers	2,147	2,668	17,099	20,224
Horseshoes	73	1,512	2,245	3,113
Cast radiators	465	188	1,701	4,017
Total	512,104	503,075	3,670,011	4,250,186

IRON AND STEEL IMPORTS, GROSS TONS

	August		Eight months ending August	
	1918	1917	1918	1917
Pig iron	3,910	5,790	29,852	55,109
Scrap	3,568	11,213	29,895	161,789
Bar iron	295	402	1,283	1,905
Ingots, blooms and billets	3,096	6,276	25,817	30,812
Structural shoes	173	1,063	1,800	2,745
Rails	740	1,174	4,143	5,495
Sheets and plates	55	92	1,304	1,192
Tin and terne plate	.....	.....	32	125
Wire rods	683	119	6,535	312
Total	12,520	26,129	100,661	259,484

IMPORTS AND EXPORTS, GROSS TONS

1915	Imports	Exports
July	20,858	380,340
August	27,556	405,949
September	23,345	382,113
October	34,318	349,843
November	37,131	362,764
December	35,408	353,853
1916		
January	15,824	360,102
February	20,279	368,980
March	15,159	438,649
April	20,176	384,452
May	32,114	538,657
June	26,885	515,214
July	14,774	502,330
August	23,255	571,401
September	25,559	643,762
October	30,169	588,892
November	42,545	554,219
December	44,134	580,988
1917		
January	40,910	608,281
February	24,947	449,099
March	37,943	606,559
April	48,213	519,397
May	26,479	582,303
June	29,080	629,395
July	28,859	346,393
August	26,129	503,075
September	20,196	482,311
October	14,225	557,138
November	13,995	473,549
December	13,769	654,867
1918		
January	12,875	495,057
February	12,941	438,848
March	14,345	379,924
April	11,371	462,887
May	14,387	488,515
June	13,913	418,605
July	11,511	452,759
August	12,520	512,104

Foundrymen to Meet

The National Founders' association will hold its twenty-second annual meeting at the Hotel Astor, New York, Wednesday and Thursday, Nov. 13 and 14. The administrative council will hold its session Tuesday, Nov. 12, and the alumnus dinner will be served that evening. The convention banquet is set for Wednesday evening.

IRON AND STEEL IMPORTS, GROSS TONS

	August		Eight months ending August	
	1918	1917	1918	1917
Spain	.....	.....	15,563	133,906
Sweden	.....	5,074	.....	57,429
Canada	9,179	31,695	60,429	104,585
Cuba	82,213	26,802	460,387	305,665
Other countries	4,500	.....	5,500	11,944
Total	95,892	63,571	541,879	613,529

Provide Clearing House For Steel

Requirements of Various Government Departments and of Allies Fitted More Closely to Mill Capacity—Adjust Allocations to Make Mill Operations More Efficient —Allied Pool Now on Working Basis

WASHINGTON, Oct. 8.—Establishment of an intra-governmental clearing house to adjust estimated requirements of steel plates, shapes, projectile bars and rails to capacity two months in advance, appears to be a move on the part of the steel division of the war industries board which will go a long way to solve so-called "shortages" which crop up every time some department or other fails to obtain delivery through diversion of its materials to some more essential use. This new plan, which has just been put into effect, aims to touch only those steel products in which the demands are overwhelmingly greater than the mills can possibly supply.

This clearing step, in addition to forcing upon each government and allied purchasing official the burden of combining his own specific needs so that there can be no criticism from that quarter, likely will be of special benefit to the mill operators. On government orders, mills apparently are not particular to whom their output is to be shipped just so long as they can fill the orders economically and without too much upsetting of mill practice.

Future Requirements Outlined

At these intra-governmental clearing house meetings, which really are also inter-governmental because of representation of the allies, representatives of the army, the navy, the shipping board, the railroad administration and the allies, through the allied purchasing commission, meet with officials of the steel division. Each presents his department's actual requirements of plates, shapes, rails and projectile steel and the steel division officials make known the estimated capacity and all the figures covering deliveries two months hence

In this way actual requirements are measured to capacity and the various needs pared to meet the actual output. If there happens to be a surplus of capacity, the steel division then takes up with other agencies of the war industries board, chiefly priorities and conservation sections, and may allocate the remaining capacity to essential nonwar consumers. In view of the war requirements of the four products being considered ,at these meetings now, it does not appear likely there will be any surplus of these capacities.

These conferences deal only with orders allocated and on the books. They have nothing to do with allocation, but are designed primarily to assist production. The effect is intended to bring about production of certain given sizes in bulk, rather than a conglomerate production of various and sundry sizes which would result in loss of time, labor, fuel, etc., in manufacture. The requirements for the particular month under consideration, are scaled to meet this condition as well as to suit the convenience of the shipyard, munition plant or railroad to which the material is to be delivered.

Want Fewer Mill Changes

Under the system of allocation it is found to be almost impossible to place orders to the convenience of the mills. This monthly conference is expected to adjust the irregularities of allocation and to provide for fewer changes of rolls and other shifts in mili machinery. This will also, it is expected, eliminate the accumulation of products and congestion at the mills and at destinations, will provide the delivery of the right sections at the right time, and will simplify the entire production program on the special products concerned.

How this new plan will work in actual practice remains to be seen. Government officials look upon it favorably. Formerly, for example, the Emergency Fleet corporation has complained of "shortage" to this or that section, later to find that at the last minute a priority order of higher rating was given the mill in order to meet an urgent demand in England, France or some other part of the allied world. Under the new plan, the Fleet corporation will be given an opportunity to consider the change before it is made.

Steel requirements from overseas are being submitted to the war industries board in more comprehensive detail as a result of the board's participation in the inter-allied munitions council at London, it was stated here last week when it became known that the pooling arrangement on practically all commodities in demand by the allies has finally been placed on a working basis. This does not mean any lessening in the heavy tonnages General Pershing and the allied armies are demanding but it does mean the allocations at this end of the transatlantic war machine may be handled more expeditiously.

Chairman Baruch of the war industries board last week declared the international plan has finally been set to running smoothly. In discussion of the arrangements Paul Mackall, formerly with the Bethlehem Steel Co. and, until his departure for Europe, in charge of the projectile, rail and alloys steel section of the steel division of the board, was complimented for the efficient manner in which he is handling the steel requirements and making them known by cable to the steel authorities here. Mr. Mackall is a member of the mission sent to London under L. L. Summers, technical adviser of the board, and of which John Hughes, chairman of the pig tin subcommittee of the American Iron and Steel institute, is also a member.

While the information Mr. Mackall is sending has not been publicly discussed, it is understood it in nowise conflicts with the duties of the various allied purchasing commissions in this country, the latter, while possibly not exercising their functions as fully as formerly still look after the minute details. The work of the munitions council is intended primarily to prevent duplication of effort, to save ship tonnage and to expedite delivery of all war materials. This would have the effect of ordering in America, both for allied and American account, only such steel as could not be produced in England, France or Italy.

Built Around Five Councils

The war industries board has failed to make public announcement of the details, chairmen, committees, etc. Such facts as have been published, with the exception of the arrival of the commission and the arrangements on tin have leaked out from various sources in this country and overseas. However, it is definitely known that co-ordination of effort by the associated governments in addition to military and naval activity, amounting to centralized control, is built around five inter-allied councils: war, shipping, munitions, food and finance.

Under these special bodies completion of a common economic and industrial program is now being undertaken, chiefly in London and Paris, and limited to the following cases: Where two or more governments are interested in supplies which must be transported overseas to supplement deficiencies in local production; where several sources of supplies should be agreed upon together with the allotment and method of their distribution or utilization; where there might without agreement be competition between governments in procuring supplies or a wasteful duplication of productive effort.

Attack Pig Iron Obstacles

WASHINGTON, Oct. 8.—The pig iron section of the war industries board is bending every effort to see that responsible government departments meet the requirements placed upon them by the individual blast furnaces over the country in the general hope that elimination of furnace troubles will speed production for an additional 4,000,000 tons of iron. This action is the result of the conference here two

weeks ago of more than 100 blast furnace representatives at which each was given opportunity to tell his troubles and at which various government officials were present to answer, explain and make suggestions.

Better grade of coke is now being produced in the Connellsville and other northern regions and the output of both coke and pig iron is continuing steady, according to information reaching the steel division. In the south, however, the shortage of labor is proving so serious that the coke and pig iron outputs have fallen off and poorer iron is being manufactured. To meet this situation, information has been furnished Hugh Frayne, labor's member of the war industries board, with the hope he will be able to improve the situation through the government and labor supply bureaus. Transportation and coke troubles are being taken up with their respective departments.

Furnaces running on steelmaking metal are now producing 80 per cent of the entire pig iron output of the country. To meet local conditions arising in various parts of the country, stacks are being shifted from basic to foundry iron or vice versa in order to supply essential needs as impending shortages may indicate. With the growing demand for war steel, the supply of pig iron for less essential purposes has practically been shut off and the visible supply of scrap is rapidly dwindling.

Producers of low phosphorus pig iron are meeting today with Jay C. McLauchlan, chief of the pig iron section, to discuss their 1919 raw material requirements. Allocation of supply of low phosphorus ore, increased shipments of pyrites, and other steps, all looking toward an increased production of this grade of pig iron, will be discussed at the conference.

Manufacturers of cast iron pipe, whose normal output is about 1,500,000 tons annually, were in conference with Mr. McLauchlan and Frank Purnell, assistant to the steel director, last week with the result a national war service committee is to be formed to handle all matters up for discussion between the industry and the government. At the conference last week it was found the cast iron pipe output today is between 30 and 40 per cent of normal and steps likely will be taken for even further curtailment. Two weeks ago it was stated reductions in sizes, uses, etc., of pipe now being manufactured would result in a saving of 40,000 tons of pig iron.

Politics Loom in After-War Legislation

WASHINGTON, Oct. 8.—Bills introduced in congress to provide for the solution of social, economic and industrial problems after the war are looked upon by the business interests of the country with favor. They are accepted as an indication that congress is alive to the many perplexities that will be met after hostilities are ended in restoring the equilibrium of the commercial world and the new condition that will be faced by the United States. Other countries, including England and France, already have taken steps in this direction and it is realized that this country cannot afford to lag behind in this important matter.

Criticism, however, has been directed toward the apparent tendency to drag politics into the situation, which seems to be looming up. This turn of affairs developed during the past week when two pieces of proposed legislation of the character mentioned were introduced, one being offered by Senator Weeks, republican, of Massachusetts, and the other by Senator Overman, democrat, of North Carolina. A resolution identical to that of Senator Weeks was offered in the house by Representative Madden, republican, of Illinois. Contention that arose over these resolutions and the Overman bill gave the impression, whether well founded or not, each political party is jockeying for political preferment, a thing which business interests insist should be scrupulously avoided.

Denies Administration Backing

While the Overman bill was taken in some quarters to represent the views of the administration, for which Senator Overman so frequently has stood sponsor in connection with important legislation, he denied that it had been presented at the behest of the administration. He said he had drawn the measure himself upon his own initiative and that the bill provided for the handling of after-war problems similar to measures that recently were put under way by Great Britain and France. Senator Overman said he did not think the Weeks' resolution would go far enough. The latter would create a joint congressional committee on reconstruction, comprising six senators and six representatives. Senator Overman said that the resolution merely comprehended legislative action in the readjustment of war problems while executive function, provided for in the Overman bill, would be necessary in their broader handling, this power to be exercised in conjunction with whatever legislative aid congress was called upon to give.

Five Commissioners Proposed

The Overman bill, which was referred to the judiciary committee, provides for the creation of a federal commission on reconstruction to be composed of five commissioners, who shall be appointed by the President, by and with advice of the senate, not more than three of the commissioners to be of the same political party. It would be the duty of the commission to examine into the problems and conditions that are arising out of the war and that may arise out of the transition of the economic, industrial and social life of the nation from a state of war to a state of peace, and to report to congress from time to time the results of such investigations with recommendations for new and additional legislation.

Detailed purposes of the bill are carried in Section 4, which follows:

Section IV. That it shall be the duty of the commission to investigate and report as above described on any and all questions that may be referred to it by the senate or the house of representatives or by the President arising out of the conditions of war above described; and more particularly it shall investigate and report on the following problems:

(a) The financing, regulation, control and development of the merchant marine.

(b) The development, financing, expansion and direction of foreign trade.

(c) The reorganization, financing and readjustment of industries engaged in war work by way of reconverting them to normal production.

(d) Technical education and industrial research as a means of developing and strengthening industry.

(e) The redistribution and employment of labor in agricultural and industrial pursuits and the problems of labor growing out of demobilization.

(f) The supply, distribution and availability of raw materials and food stuffs.

(g) The conservation and development of national resources.

(h) Inland transportation by rail and water.

(i) Communication by telephone, telegraph and wireless.

(j) The reorganization of government departments, bureaus, commissions, or offices with a view to putting the government on an economic and efficient peace basis.

(k) The consolidation of such acts and parts of acts of congress as relate to the same subject matter but which now appear at various places in the statutes.

"Congress will have to pass laws on railroad, food, fuel, and all other public affairs that have been turned over to the government for control during the war," said Senator Watson. "The wage question will have to be settled by an act of congress, for it will be a matter beyond any other power. In the process of rehabilitation we shall also have the tariff to readjust. The executive cannot do that; it will be for congress to pass a new tariff law. In many other after-war affairs that will affect the very life of the nation, congress will be called upon to pass laws. I hope that some adjustment may be made between the two measures. If not, the Weeks resolution will be supported by the republicans in both houses. Congress cannot afford to surrender its prerogative after the war."

Representation of organized labor by at least two members of any federal commission that may be created to consider the problems of reconstruction after the war is called for by the executive council of the National Federation of Federal Employes in a resolution adopted at its session last Friday at the national headquarters in Washington.

The employment service is taking vigorous action in protecting war industries from raids on their working forces. Recently a war industry wired that its men were being stolen by a competing concern, which took the "key" man away, the latter inducing other employes to follow. As a result production was thrown entirely out of gear. The employment service immediately demanded that the offending firm return the men, which was done, their transportation expenses back to the first plant being paid by the offender.

Midvale Labor Plan in Operation

Company and Employes Agree on Method for Collective Bargaining and Settlement of All Disputes—Plan Expected to Insure Plants Freedom from Labor Troubles

THE agreement of the Midvale Steel & Ordnance Co., and its subsidiary, the Cambria Steel Co., with their employes, providing for collective bargaining by the employes and the equitable adjustment of all disputes, now is in full operation and is expected to insure the plants operated by these companies freedom from labor troubles and outside influences of labor agitators. The plan was put in effect Sept. 25, closely following the adoption of the 8-hour day by the United States Steel Corp. It is a practical application of President Wilson's pronouncement on the right of employes to bargain collectively, the plan being adopted by peaceful measures which, according to reports, have established a noticeable spirit of co-operation.

For the administration of the plan it is provided that each plant shall be divided into as many divisions as may be decided upon by division representatives of each plant, on the basis of one representative for each 300 employes. If any division shall have 150 men in excess of 300, or multiple of 300, it shall be entitled to a representative for such fraction. In case the fraction is less than 150 it shall not be counted unless merged with a similar fraction from another division. This representation will be based on the average number of employes of each division as shown on the books of the company for October, November and December preceding election.

Employes of each division will elect their representative annually, the plan providing in detail the method for nominations and elections, secret ballots being used. Within a week from the date the division election committee announces the names of the representatives the latter will meet and elect from their number a plant conference committee, consisting of one man for each 3000 employes and an additional one if the number of employes in excess of 3000 or any multiple thereof is 1500.

Any employe having any grievance or any matter on which he desires to have a decision must first present the subject to his foreman or superintendent, either in person or through his division representative. If unable to obtain a satisfactory adjustment the employe or the representative may present the matter in writing to the plant conference committee. If this committee considers the grievance a just one it may submit it to the general superintendent, who will confer with the committee. The superintendent may if he desires call into the conference all division representatives. If they are unable to agree the matter must be referred to a committee consisting of all the general superintendents of all the plants of the company and all the members of the conference committees of all the plants. If this general committee is unable to decide, the case must be referred to arbitration. One person will be elected as arbitrator if the parties can agree upon his election, otherwise there will be a board of three arbitrators, one member to be selected by the president of the company, one by the employers' representatives and these two to select a third, if necessary. The decision of the arbitrators is binding on both company and employes.

The right of the company to hire and suspend or discharge men is limited, except as follows:

Any employe, guilty of any of the following offenses, shall be subject to immediate discharge without notice:

Disloyalty to the United States government, by act or utterance; any offense against the criminal law of the state; assault upon, or attempt to injure, another person; wanton destruction of property; refusal to obey a reasonable order of his superior officer; intoxication while on duty.

For offenses of a less serious character, such as carelessness, failure to report for duty regularly and at the proper time, inefficiency, etc., it shall be the duty of the officers to secure efficiency by giving the offender at least one caution, which, if not heeded, may be followed by dismissal without further notice.

Any employe discharged shall have the right of appeal to the general superintendent either in person or through his elected representative.

Once every three months, at times and places mutually agreed upon by the president of the company and the conference committees of the plants, there will be a combined meeting of all elected representatives with the officials of the company to discuss all matters of general interest to both parties.

Tonnage and Piece Work Will Get Extra Pay

Payment on a basis of time and one-half for all hours in excess of eight applies to the tonnage men and piece workers as well as to others employed in the plants of the United States Steel Corp., under the new basic 8-hour day rule, according to an announcement by the corporation. This sets at rest considerable speculation in certain quarters as to whether the tonnage and piece work wages were to be readjusted. There will be no other adjustment than the payment of these employes for overtime work on the same basis as other employes are paid.

Another point explained by the corporation is that no extra wages will be paid for work on Sunday or holidays except for work in excess of eight hours and then only on a basis of time and one-half. This is due to the fact that so many essential iron and steel plant operations must be continued the same on Sundays and holidays as on others and extra compensation would involve abnormal pay for this kind of work. Plant operatives are said to have expected double time pay for Sundays and holidays.

Steel manufacturers believe that recognition of the basic 8-hour day with allowance for half-time extra pay for overtime in addition to the series of wage advances granted since Jan. 1, 1916, is fair in the face of decreasing profits, due to heavy taxes and the wage advances.

The Employers' association of Pittsburgh, representing approximately 400 companies in the Pittsburgh district, recently adopted unanimously a resolution recommending to all members the adoption of the 8-hour basic day, the change to be retroactive to Oct. 1. Among the companies that will go on the new schedule are the Westinghouse Electric & Mfg. Co., the Westinghouse Airbrake Co., the Union Switch & Signal Co., the Mesta Machine Co., the A. Garrison Foundry Co., the MacKintosh-Hemphill Co., and the United Engineering & Foundry Co.

Exhibit Shows War Effort

(*Concluded from Page* 849)

Nonferrous alloys and metals used in the foundries were attractively displayed by a number of manufacturers. In ingot form were displays of brass and bronze, as well as samples of copper, aluminum, tin, lead, spelter, antimony and other metals and alloys. Castings also were shown. These manufacturers included the Lowenthal Co., Chicago; S. Birkenstein Sons, Chicago; New Era Mfg. Co., Kalamazoo, Mich.; and Progressive Metal & Refining Co., Milwaukee.

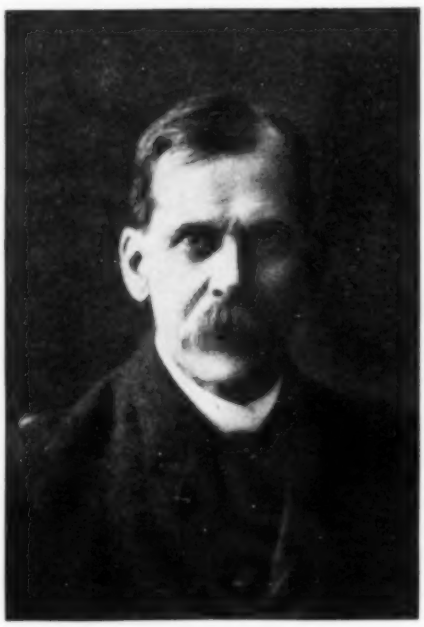
Safety equipment of various kinds was prominent among the exhibits. These included goggles, helmets, masks, leggings, signs and wearing apparel. A nonshattering glass was demonstrated. These exhibitors included the Strong, Kennard & Nutt Co., Cleveland; Julius King Optical Co., Chicago; Standard Optical Co., Geneva, N. Y.; Holcomb Safety Garment Co., Chicago; R. P. Smith & Sons, Chicago; and F. H. Wheeler Mfg. Co., Chicago.

Wharton Uses Own Ore

Iron ore now is being furnished the blast furnaces of the Wharton Steel Co., Wharton, N. J., from its Scrub Oak mine which it commenced to operate to full capacity Oct. 1. These furnaces have been using considerable Superior ore in their mixtures. The haul from the mine to the blast furnaces is about one-quarter of a mile. The Scrub Oak mine is one of three operated by the Wharton company.

Obituaries

WILLIAM J. KEEP, one of the most prominent mechanical and civil engineers of the country, died Oct. 7, at St. Mary's hospital, Detroit, from injuries sustained by his being struck by a street car. For the past 35 years, Mr. Keep has been affiliated with the Michigan Stove Co., Detroit, and in recent years his connection with that enterprise has been in a consulting capacity. He left Troy, N. Y., in 1883 to become that company's first superintendent. In Troy, he was a lecturer at the Rensselaer Polytechnic institute and was likewise connected



WILLIAM J. KEEP

with the Fuller-Warner engineering firm there.

Mr. Keep was 76 years of age. He was born in Oberlin, O., and was graduated from that city's Union college for engineers. As a result of his research in pure science on the shrinkage properties of iron, Mr. Keep evolved what is known as "Keep's System of Mechanical Analysis" which has met with wide adoption in foundries in this country and foreign countries as well. This system aimed to measure the silicon content of iron in the mold, doing away in many cases with the necessity for chemical determination during the tapping of the heat from the cupola. This without doubt, was the crowning achievement of Mr. Keep's career. During the transition period in foundry practice from the so-called practical to scientific methods, he was associated with the well known small group of men which included Dr. Richard Moldenke, Major Joseph T. Speer and the late Thomas D. West. These four among others were prominent figures in bringing American foundry practice to its present advanced position. Mr. Keep was consulted by foundrymen all over the country who brought their problems to him. He was one of the most prolific writers on foundry practice and foundry matters, in the country. Contributions from his pen have appeared in many engineering journals and in *The Foundry*. He was a well-known author of standard and practical technical works, including "Cast Iron" which he published in 1902 and which is used extensively in engineering colleges.

Mr. Keep was a member of the American Association for the Advancement of Science; the American Society of Mechanical Engineers; American Association of Mining Engineers; the Iron and Steel institute of England; the International Association for Testing Materials; the American Foundrymen's association and many other organizations. He likewise was connected with the Franklin institute.

His daughter, Henlen E. Keep, is Michigan state chairman of the war organization known as "national women's service" and his son, Lieut. Col. Henry Keep, is consulting engineer on the staff of the chief engineer of the United States army in France.

Charles Gustavus Roebling, president of the John A. Roebling's Sons Co., Trenton, N. J., and one of the foremost mechanical engineers of his time, died at his home in Trenton on Oct. 5. Death was due to Bright's disease, with which he had been stricken late in August.

Mr. Roebling was the third son of the late John A. Roebling, founder of the Roebling works and was born in Trenton, Dec. 9, 1849. After graduating from Rensselaer Polytechnic institute of Troy, N. Y., with the class of 1871, he became actively identified with his father's company as mechanical engineer. He soon came into prominence in handling the mechanical problems of the plant and his genius along this line, coupled with the business and commercial talent of his brother, the late Ferdinand W. Roebling, brought about the great development of the Roebling properties. When he entered the Roebling plant in 1871, it consisted of a single mill. Today, scores of mills are embraced in three general groups, including the upper or main Trenton plant, the Buckthorn plant and the Roebling, N. J. works. All the buildings and the equipment were designed and erected under the direction of Mr. Roebling. When John A. Roebling died, the business, according to his will, was valued at $150,000. At the present time the book value of the works is approximately $50,000,000 and the employment force about 8000 men. An example of Mr. Roebling's genius in meeting emergencies is illustrated by the incident which forced the Roebling plant out of the manufacture of small wire for the binding of wheat. When wire was thus used, pieces of the binder became ground into the wheat and some deaths resulted from persons eating the flour into which bits of steel had been mixed. This situation killed the wire sheaf binder business. Mr. Roebling thereupon was called upon to transform the wire binder plant into one for the manufacture of wire cloth which he did with notable success.

Mr. Roebling's greatest accomplishment as an engineer is considered to be the town of Roebling, N. J., which was his own idea. He drew every plan for the layout of the village, de-

CHARLES G. ROEBLING

signed and constructed the steel works and mills, as well as the homes of the workmen. This community project up to this time has involved an expenditure of approximately $15,000,000. Mr. Roebling's skill brought him into consultation on some of the important engineering problems of the present generation. Notable among these are the Oil City suspension bridge at Oil City, Pa., the cables of the Williamsburg suspension bridge in New York and the erection in Central park by the city of New York of Cleopatra's Needle which had been brought from Egypt. At the time of his death he was reputed to be the wealthiest member of the Roebling family. His stock holdings of the Pennsylvania railroad are said to be the largest in New Jersey. Besides his business connections with the Roebling company, he was president of the New Jersey Wire Cloth Co., vice president of the John A. Roebling's Sons Co. of New York and a director of the Mercer Automobile Co.

Of the immediate Roebling family, two brothers, Col. Washington A. Roebling of Trenton and Edmund Roebling of New York survive.

Priority in War Industry

Sixth Installment

Development of Priority

Outline of Process — The Problems Met

Rule of Subcontracts is Clarified

BY C. J. STARK

Editor, The Iron Trade Review

IT has required months of careful study and application on the part of the priorities authorities to bring the priority system to its present widely functioning basis. As was to be expected, the development of so radical and comprehensive a method of industrial regulation, could be achieved only by gradual steps dictated in the light of experience and by conforming the application to the new conditions that have arisen from time to time and which could not have been foreseen originally. There has been built up, tier by tier, a structure of rulings, interpretations and precedents upon which has been based a working operation of the system covering most of the ordinary contingencies that are the accompaniment of wartime industry. There still remains some obscurity as to the exact intent and scope of certain sections of the priority regulations due to a lack of clean-cut instructions on the part of those administering the priority system or what is probably more the case to a failure to give an adequate and prompt general circulation to official advice. This is a continuing cause of confusion and perplexity for many manufacturers and it has led to the display of more or less irritation among the latter. Yet in all its bigger and broader aspects, the principle of "purposeful discrimination" is being applied to industry today with a minimum of conflict and with great effectiveness.

It may be truthfully said that the priority system is fulfilling the essential purpose of its creation which was to make certain that the striking power of American industry would be wielded most heavily and quickly against the common enemy. The extremely difficult task of the priority division of the war industries board is being capably and skillfully discharged.

Control of production through priority today unquestionably is on a more comprehensive scale then could have been foreseen when the necessity which produced the plan first arose. The system itself without doubt has gone through a reformation process. Its ramifications and scope have kept step with the enlarging duty which industry has been called upon to assume in this war. This has been especially true in iron and steel, and the manufactures of iron and steel with which priority has been most particularly concerned. The proof of this is the far-reaching character of the present regulations of priority and the elaborate machinery that has been required to administer them. Yet the trend has been constantly toward a simplified and smoother application.

No greater forward step in this direction has been taken than the establishment of the method of automatic classifications by virtue of Circular No. 4 issued under date of July 1. This circular in question by reason of the complete and detailed character of its contents has done more to clarify the real meaning and application of priority for the individual manufacturer than any other pronouncement of the priorities board. The intent of the automatic plan to permit the user to classify his own orders for materials, equipment and supplies in accordance with their purpose was to eliminate formal procedure as far as possible and thereby save much valuable time. The results show this end has been accomplished. Thousands of orders are being classified, rated and filled automatically today without the use of a priority certificate or without any direct participation in the transaction of the priority administration.

Subcontracts Cause Trouble

But as has been brought out strikingly by the numerous requests for advice and assistance received by THE IRON TRADE REVIEW from producers on all sides there are points regarding the automatic system that have been the cause of deep perplexity and of divergent opinions among those whom they concern.

One of the matters which has been the subject of a wide difference of judgment and considerable confusion has been the priority relation of subcontractors to the automatic classification extended to principal contracts. This has been especially true of section 7 of Circular No. 4, which provides for the application of a A-5 rating on all orders placed by the navy department, the war department, or the United States shipping board, when an indorsement personally signed by the officers placing the order accompanies the latter. Some companies took the position that the A-5 rating could be applied to the various subcontracts which entered into the completion of the principal order. In certain cases these companies accepted a photostat reproduction of the original order furnished by the subcontractor as sufficient grounds to entitle the latter to the same classification. This interpretation of section 7 however, apparently, was more extensive than the priority authorities were inclined to permit. The doubt over subcontracts under section 7 now has been cleared up by the advice of the priorities committee, rendered to various companies which have applied for a ruling on this point. In substance this permits the extension of the A-5 rating to the first subsidiary contract where it is not already covered by an automatic rating under section 8 of Circular No. 4, which confers this standing for materials, supplies and equipment for certain specific purposes. It also permits the extension to the first subcontractor of the rating of a priority certificate higher than A-5 to section 7 orders. The instructions of the priority committee on this subject, which have been issued in the form of a letter from Secretary Hirsch of the committee and which is to be attached to the subsidiary orders under section 7, pending the issuance of an official supplement promulgating this rule, is as follows:

"When it is necessary for you to have priority assistance to obtain delivery on an order for materials, equipment of supplies to complete a direct order for the war department, the navy department, or the United States Shipping Board Emergency Fleet corporation, which direct order is covered by an A-5 automatic priority rating under the provisions of section 7 of circular No. 4 or is covered by priority certificate of class A-5 or higher rating, you may attach to your own order for such materials, equipment or supplies the automatic A-5 priority rating, provided you attach to such order the affidavit provided

as under section 8 of circular No. 4, including in the affidavit the following:

"'The materials, equipment or supplies covered by this order are intended for use and will be used for the purpose of completing an order placed with me directly by (insert name of government department) and which bears a priority rating of class A-5, by virtue of automatic rating under endorsement personally signed by ....., a duly authorized officer of said department, or by virtue of priority certificate No. ...., class A ....., issued by the priorities committee of the war industries board.'

"A copy of this letter should be attached to your orders, pending the issuance of supplement promulgating this rule.

"The automatic A-5 priority rating herein provided for will not apply where a person is manufacturing a product or doing work which is of itself entitled to an automatic rating under section 8."

This new ruling supersedes a former interpretation by the priorities committee that the automatic classification of A-5 under section 7 applied solely to the order placed by the particular officer of the specified government department. This opinion confined the operation of the priority as against only the concern with which the order actually was placed by the government department.

In distinction from section 7, it has been generally understood, and this is the procedure now commonly applied, that the automatic classification provided by section 8 may be applied to subsidiary contracts, all along the line down to the raw material.

The changed position of the priority authorities on the position of subsidiary contracts under section 7 is illustrative of the process of adjustment which has been going on in the priority system to meet the new conditions that have been arising or to establish a practice which would permit the more expeditious functioning of the system. This process has been going on steadily until now a well-rounded out and virtually complete code of procedure has been laid down.

One manufacturer, writing to THE IRON TRADE REVIEW, says: "Outside of the question of labor, this priority business is causing more work, worry and trouble in the iron and steel trade than any other one thing." This is a fair estimate of the importance of the priority system to the average producer under present conditions. This manufacturer, as have various others, makes a plea for better and more systematic publicity on the part of the priority authorities. One of these appeals, which is typical, is published in connection with this article. It would appear that the priorities board could hearken with profit to these suggestions because the need of widespread publicity was never more urgently present than in connection with its rules and interpretations. This has been especially true under the changing process by which priority control has reached its present completed stage. It is the concensus of opinion that the trade papers have served a highly important function in disseminating the various announcements and circulars of the priority board and committee. Perhaps never before has general industry been obliged to adjust itself to so sweeping an interference of its normal course, and to such a necessarily intricate system of federal regulation as it now must face scores if not hundreds of times in the period of an ordinary business day through the priority system.

Coupling Publicity With Priority

BY GILBERT CANTERBURY

Sales Manager The Falls Rivet Co., Kent, O.

BEFORE the iron and steel industry settles down to a methodical, efficient and speedy execution of important war orders, about one hundred and one things in connection with the issuance of production priority classes must be adjusted and the adjustment given general, broad-cast publicity.

Circular No. 4 was issued by the priorities division of the war industries board under date of July 1 and yet after 11 weeks I submit that no man understands fully the priority system under which industries are expected to operate and not more than one out of 10 manufacturers has better than the most vague idea of what Circular No. 4 was intended to accomplish.

It is not only the small and isolated manufacturer who is out of step in this matter, either. Some of the largest and best known industrial corporations of the country are still placing orders daily for iron, steel or iron and steel products without attaching affidavits. Many of them forward improperly drawn affidavits after their first error has been pointed out to them. In my own business I have been compelled, in some instances, to return affidavits as many as four times before a properly executed document finally came into my hands and enabled me to place an important order for war material on the production schedule.

A short while ago a fellow manufacturer showed me two letters received on the same day from one of the big steel corporations. One letter was from the sales department and explained that while government order numbers had been sufficient for the scheduling of orders in the past, affidavits would be required thereafter. The other letter was from the purchasing department and an order was enclosed to which neither government number or affidavit was attached. That corporation was doing its share of the educational or publicity work but was not practicing what it preached. There are thousands of such instances in the industry every day.

It is the concensus of opinion among leading manufacturers that the main reason for such lack of understanding of the provisions of Circular No. 4 and following circulars and supplements lies in the fact that no methodical distribution of the circular was planned before issuance. I venture that at this late day many manufacturers are without a copy of this very important document. Recently I applied for extra copies and was informed that none were to be had.

In explanation of this it was stated that the government printing office was so busy with work connected with the fourth Liberty loan that the order for No. 4 circulars had been forced into a low classification. I should have liked to receive the circulars but I got a lot of amusement out of this instance of the priority board being shelled with its own ammunition.

Much of this sort of trouble would be dispensed with if adequate publicity were given to every issuance of the priority board's rulings. Most of the other departments of the government have made wide use of publicity mediums. Every effort is made to acquaint people with Liberty loans; the Emergency Fleet corporation has undertaken by publicity to speed up the production of ship material; the labor department is making general use of printed matter in its educational work. The whole business of winning the war would be helped along materially by giving a tiny share of publicity to what is required for the proper scheduling of war orders.

Practically every manufacturer in the country is vitally interested in every circular or ruling that the priority board issues—and this is true whether the manufacturer produces war material or not. Of course, it is each manufacturer's responsibility to acquaint himself with these rulings, one might say, but there are many who would answer that the proper facilities for acquainting one's self are not available. For instance I know of one group of manufacturers who have an association with a general office in an important middle-west city. The secretary of this association received many inquiries for information regarding Circular No. 4 and attempted to secure for his office copies of every piece of printed matter issued by the priority board. He did not succeed and perhaps some of his members are still in the dark.

Every manufacturer should see that his organization becomes familiar with the priority system. Particularly should their selling and purchasing departments become informed on this subject. A diligent effort should be made to comply with all rules and regulations at the time of placing orders to avoid all unnecessary delay at the production end. Likewise the selling organization should keep orders up to the mark, scrutinizing every order and making sure that it is properly classified in its proper class before entering it for production.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

JUDD J. BROOKS JR., of the Harbison-Walker Refractories Co., Pittsburgh; R. D. Hatton of LaClede-Christy Clay Products Co., St. Louis, and P. S. Keir of the Kier Fire Brick Co., Pittsburgh, have been chosen by the refractories industry, with the approval of the chamber of commerce of the United States, as the refractories war service committee. The committee will act as an advisory board to Charles Catlett, chief of the refractories section of the chemical division of the war industries board.

Fred W. Vormelker has been appointed efficiency engineer of the Russel Motor Axle Co., Detroit.

Frank M. Taylor has been appointed director of purchases for the Parish & Bingham Co., Cleveland.

James D. Robertson, sales manager of the Pittsburgh Valve, Foundry & Construction Co., has been elected a director of the company.

F. O. Bunell, chief engineer of the Southern Wheel Co., St. Louis, has been elected vice president of that company, with headquarters at St. Louis.

Dwight D. Miller has been made manager of the recently-opened New York office at room 1806, 15 Park Row, of the Electric Furnace Co., Alliance, O.

H. F. Harris, widely known in the motor truck field, has been appointed general manager of the Republic Motor Truck Co., Alma, Mich.

John G. Monihan has been re-elected president of the Harroun Motors Corp., Wayne, Mich. This company is making shells for the government.

William J. Priestley has resigned as division superintendent of the Bethlehem Steel Co.'s forge and machine shops and foundries at Bethlehem, Pa.

Gustav Hill, Port Huron, Mich., has been elected president of the Langell Shipbuilding Corp., St. Clair, Mich. Alexander Langell of Cleveland is secretary.

Mathew C. Brush has been elected a vice president of the American International Corp. Mr. Bush formerly was president of the Boston Elevated railroad.

John L. Gans, editor of *The Courier*, Connellsville, Pa., has been made a member of the production committee of the federal fuel administration in the Connellsville regions.

Charles M. Smith, formerly affiliated with the Detroit Steel Casting Co. and the Michigan Steel Castings Co., Detroit, has been appointed superintendent of the foundry operated by the Nelson Bronze Co., Saginaw, Mich.

Albert W. Russel, former treasurer of the Russel Wheel & Foundry Co., and now president of the Russel Motor Axle Co., Detroit, has been appointed a member of the war credits board to succeed Fernando P. Neal, resigned.

William B. Stout, former aircraft engineer of the Packard Motor Car Co., Detroit, has resigned as technical advisor to the aircraft board at Washington to undertake the manufacture of airplanes in Detroit.

W. T. James, who for more than two years has been affiliated with the Washington Steel & Ordnance Co. in its metallurgical department, now is connected with the tool steel department of Edgar T. Ward's Sons Co., Boston.

F. L. Estep resigned recently as chief engineer of the Nova Scotia Steel & Coal Co., Ltd., New Glasgow, N. S., to become affiliated with the consulting engineer firm of C. P. Perin and S. M. Marshall, at 2 Rector street, New York.

W. W. McMillan, purchasing agent of the National Malleable Castings Co., and Frank R. Anderson, assistant purchasing agent of the company, recently were transferred from the Sharon, Pa., works to the company's main office in Cleveland.

Charles B. Wilson, former vice president and general manager of the Ferro Machine & Foundry Co., Cleveland, has been elected to the directorate of the Curtiss Aeroplane & Motor Corp., Buffalo, with the office of vice president in charge of production.

H. L. Mode, formerly sales engineer in the crane department of Manning, Maxwell & Moore, New York, has been appointed manager of the crane department, operated by Young, Corley & Dolan, Inc., 115 Broadway, New York.

George F. Freed, formerly assistant superintendent of the Main street plant of the H. B. Smith Co., Westfield, Mass., now is superintendent of the Pittsburgh Gage & Supply Co., Pittsburgh, Pa., maker of electric washing machines.

J. M. Hopkins, chairman of the board of the Camel Co., Chicago, has been made a member of the priorities committee of the war industries board and will handle export matters, except those for Japan and allied governments which have war commissions.

Frank A. Mulhauser, Cleveland, who for the past year has had charge of the employment and service section of the Emergency Fleet corporation in the Great Lakes district, has been transferred to Philadelphia to do this same work on a national scale.

W. S. Blythe has been made sales manager and placed in charge of the recently opened sales office at 317 People's Gas building, Chicago, by the Republic Creosoting Co., Indianapolis. L. S. Eifel has been appointed as Mr. Blythe's assistant. The company produces wood block flooring.

M. F. Covert, assistant master car builder for Swift & Co., Chicago, has been made sales manager for the Standard Car Construction Co. in Chicago and northwestern territory, with offices in the People's Gas building, Chicago.

P. M. Seymour of the Canton Stamping & Enameling Co., Canton, has been chosen chairman of the district which includes Stark, Wayne, Tuscarawas, Homes, Richland and Ashland counties, to work out transportation problems for the relief of congestion of railroads.

Seymour Wheeler, treasurer of Pickands, Brown & Co., Chicago, sellers of pig iron and ferro alloys, has been accepted for training at the officers' training camp at Camp Zachary Taylor, near Louisville. Mr. Wheeler will train for service in the field artillery.

Capt. Paul Llewellyn of the Interstate Iron & Steel Co., Chicago, commissioned in the United States army last January, has just received his commission as major in the same service. Major Llewellyn is in the gas defense division of the chemical warfare service.

H. W. Johnson has been appointed factory manager of the Ecorse Foundry & Machine Co., Ecorse, Mich. Mr. Johnson formerly was manager of the Fairview Foundry Co., Detroit, and recently was connected with the Lakeside Foundry Co. of that city.

Clarence G. Garrigus, who organized the C. G. Garrigus Machine Co., Bristol, Conn., and was its president and treasurer until a few months ago, when it was taken over by the Wallace Barnes Co., has severed his connection with the company. He has not announced his future plans.

Willis Warner has been named general chemist of the Republic Iron & Steel Co., Youngstown, and placed in charge of the open hearth and blast furnace laboratories, succeeding T. J. Davies, resigned. He is succeeded at the Bessemer laboratories by Joseph Mayberry.

Thomas J. Little, Jr., engineer of the Lincoln Motor Co., Detroit, has been appointed a member of the welding research committee of the Emergency Fleet corporation. He has conducted extensive gas and electric welding investigations in American plants producing Liberty motors.

R. J. Mullaly has been named superintendent and Louis Miller assistant superintendent of the MacDonald bar mills of the Carnegie Steel Co., Youngstown, O. Mr. Mullaly succeeds W. U. Dennison, transferred to other work. He had been assistant and head electrician. Mr. Miller has been roll turner and designer and is rated as one of the best in this line of work in the country. J. C. Bean is general foreman.

Iron and Steel Men in War Machine

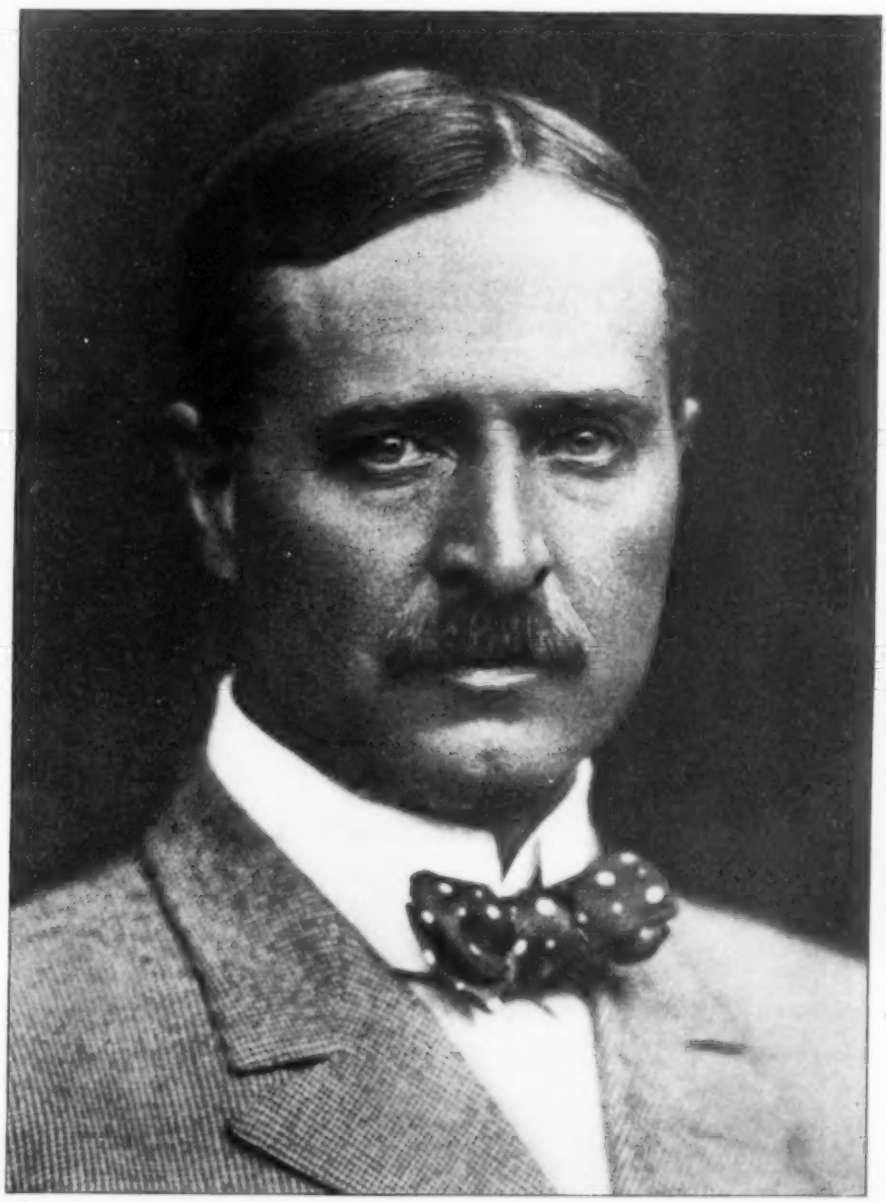
Samuel P. Bush, Chief, Division of Guns, etc., War Industries Board

SAMUEL P. BUSH is one of those men of brains and business capacity who have been singled out by the government to assist in war work. While the present struggle more than any other has called forth men having the greatest degree of military genius, after it is ended those with epaulets will not have reaped all the glory. Those men who have been chosen to command in war pursuits "over here" will also have acquired prestige. It will be difficult to find a better recommendation than "he was called by the government to superintend an important division in the industrial war work of the nation," a distinction that will rank with the highest branches of the distinctly military service.

Mr. Bush's recent appointment to the position of chief of the division of forgings, guns, small arms and small arms ammunition of the war industries board is in keeping with his standing in the iron and steel industry. The creation of the division is an indication of the fact that production in this line now is upon a quantity basis. It means that a problem which was presented earlier in the war, is now nearing solution. Scores of manufacturers wired, wrote and traveled to Washington, pleading for materials and priorities, demanding various concessions, claiming that the government's program would suffer if they were not given immediate attention, presenting a mass of data, bewildering officials of the board. Then Mr. Bush's particular talents in this direction led to his being "drafted" into the service. To him was given the task of untangling the snarl, the job of seeing that basic materials was properly apportioned to the various plants and that they produced in proper quantities.

Mr. Bush recently had added to his duties those of an important new section of the war industries board. He has been appointed chief of a new department known as the facilities division. The function of this section will be to promote the conversion of plants to a war basis. This will be done after it has been carefully ascertained which establishments can be so treated.

The war industries board believes there are unlimited possibilities in this direction, but a new problem has been born with the widespread desire to promote production. Certain manufacturers with plants totally unfitted for the production of war materials have bombarded Washington with requests for assistance, financial and otherwise, to make over their plants. Others have petitioned for steel and other material necessary to build new plants in various sections of the country. It has been the practice at Washington to discourage the building of new plants whenever the same purpose can be achieved by utilizing present structures. While some manufacturing plants can be converted to produce a certain class of war material their conversion for other classes would be unwise. One of Mr. Bush's duties is to aid in sifting the grain from the chaff and make use of only such opportunities for conversion as promise the largest measure of required production.



Mr. Bush took to Washington the experience and mental equipment of many years in the industrial field. He received his technical education at Stevens institute of technology, graduating as a mechanical engineer in 1884. In May of that year, he began four years of service in the motive power division of the Pennsylvania railroad, subsequently being made assistant engineer, in which capacity he served for two years. In 1890 he was appointed master mechanic, and in 1894, superintendent of motive power. He served in the latter capacity until 1899, when he became general superintendent of motive power of the Chicago, Milwaukee & St. Paul railway. In June, 1901, he was elected vice president and general manager of the Buckeye Steel Castings Co., Columbus, of which company he is now president. He is a member of many organizations.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Warns Disaster Attends Tax Bill Delay

FINANCIAL disaster is threatened, unless the senate takes speedy action on the $8,000,000,000 war revenue bill. This was the gist of a letter from Secretary McAdoo to Chairman Simmons, of the senate finance committee last week, in which Mr. McAdoo specifically explained that unless the treasury has time to prepare itself and the public for the collection of taxes that will be due under the new measure, the government cannot get those revenues in time to pay its war bills. Plans of the senate for an adjournment over the November elections were upset by the letter and caused the finance committee, which had already been considering the bill two weeks, to take immediate steps to expedite its work of revising the house draft of the measure. However, a feeling of consternation, mingled with resentment, was aroused in the senate and especially in the finance committee. Members of the committee said they did not believe compliance with Secretary McAdoo's demand was possible and that it was their opinion that the bill could not be finished before Christmas. Nevertheless, members of the committee will remain at work, will abandon plans to make campaign speeches and from now on will devote themselves exclusively to getting the revenue bill enacted into law.

There is no question but that the dilatory tactics of the house ways and means committee, followed by the present deliberations of the senate committee, are bound to have an injurious effect, unless the measure is corrected, and that quickly. Thousands of corporations and individuals do not know what they can do for the Liberty loan, because they do not know what Kitchin taxes are going to do to them. They do not know whether they will have funds left after they pay the income taxes, surtaxes and their other taxes. They do not even know whether they will have sufficient funds left to run their businesses. The senate must hasten its work, so that the tax collectors may lay their plans. The taxpayer must know as nearly as possible what his taxes will be so that he can estimate what he can do for the Liberty loan.

The various business reviews state that the campaign to make the fourth Liberty loan successful has produced a tendency to economize, which is hampering general business to some extent. The stock market has been highly irregular, with considerable profit taking in issues known as peace specialties. The broad inference back of the dealings has been that the market has about completed so far as the standard shares are concerned, the first phase of the readjustment that became necessary by the surrender of Bulgaria and the possibility that Turkey will do likewise.

Alien-Owned Property is Sought by Custodian

Attention is called by the alien property custodian, A. Mitchell Palmer, to the section of the "trading with the enemy act" which provides that all money or other property held by, for, or for the account of, or the benefit of, an enemy or ally of enemy, should be reported immediately to his office. This includes patents, trade marks, copyrights, prints, labels and designs.

In connection with the last named, the following persons are required to make report to the office of the alien property custodian: All persons who are in any manner interested in the use or operation of any enemy-owned patent, trade mark, copyright, print, label or design, including joint inventors, where one of the inventors is an enemy within the provisions of the act already mentioned; assignees of an undivided part or share of an invention or right to carry on a process or operate under a trade mark, copyright, print, label or design within and throughout a specified portion of the United States when such patent or process is enemy owned; mortgages and licensees of enemy-owned patents, trade marks, copyrights, prints, labels or licenses. All these include guardians, executors and administrators.

It is likewise requested that any information obtained regarding enemy interests in any patents, trade marks, copyrights, prints, labels, or designs, should be forwarded at once to Francis P. Garvan, director of the bureau of investigation, alien property custodian's office, Washington, D. C., even should the information be gossip or rumor.

Nitrate Plants

Require More October Toluol Than Available—Naphthalin Scarce

New York, Oct. 5.—The scarcity of naphthalin continues the cause of great strength in this product. Spot flake naphthalin is around 10 cents per pound at producers' plants, and spot balls around 12½ to 13 cents per pound. The same prices apply to contracts for the next season's requirements of the drug trade.

Output of toluol during October will be less than the requirements of the nitrating plants, and therefore it is expected that releases during the month, now up for consideration by the war industries board, will be made sparingly. Demand for benzol is improved, so that although stocks are fairly large, the market is firm. Quotations continue at 22 to 27 cents per gallon. In phenol active efforts continue to be made to secure material made prior to Aug. 20, owing to the export licenses recently granted; for such phenol, it is easy to obtain 44 to 46 cents per pound. The market generally is quoted at 42 to 44 cents.

It is expected that a satisfactory substitute for solvent naphtha shortly will be placed on the market but the quantities available may not be large enough to fill all needs. Government requirements of sulphate of ammonia are increasing, but production also has grown so that makers continue to book orders from fertilizer manufacturers and other users.

Coke Oven By-Products

Spot	
Per Gallon at Producers Plant	
Pure benzol	$0.22 to .27
Toluol (on sales sanctioned by government) (tank cars)	1.50
Toluol (on sales sanctioned by government) (drums)	1.55
Toluol (for government)	1.50
Solvent naphtha	no market
Per Pound at Producers Plant	
Phenol	$0.42 to .45
Naphthalin (nominal)	.12½ to .13
Per 100 Pounds at Seaboard	
Sulphate of ammonia (to fertilizer trade)	$4.50 to 4.75
Contract	
Pure benzol	nominal
Toluol	no market
Solvent naphtha	nominal
Per Pound at Producers Plant	
Phenol	nominal
Per 100 Pounds at Seaboard	
Sulphate of ammonia (for commercial use)	no market
Sulphate of ammonia (for government)	$4.50

Cut 'Buffer' Supply of Ship Steel

Officials of Emergency Fleet Corporation Will Not Let Builders Accumulate Excess Stock With Padded Estimates—Send Experts to Check Up Requirements—Wide Variance Shown in Estimates

THE steel ship construction division of the Emergency Fleet corporation has just completed a survey of the steel stock requirements of the various yards in building 3500 and 5000-ton cargo ships. There was such a wide variance in estimates made by the yards as to the tonnage of steel plates and shapes needed to cover the construction operations on the respective ships that the division sent a staff of experts to the different plants to determine the real facts of the situation.

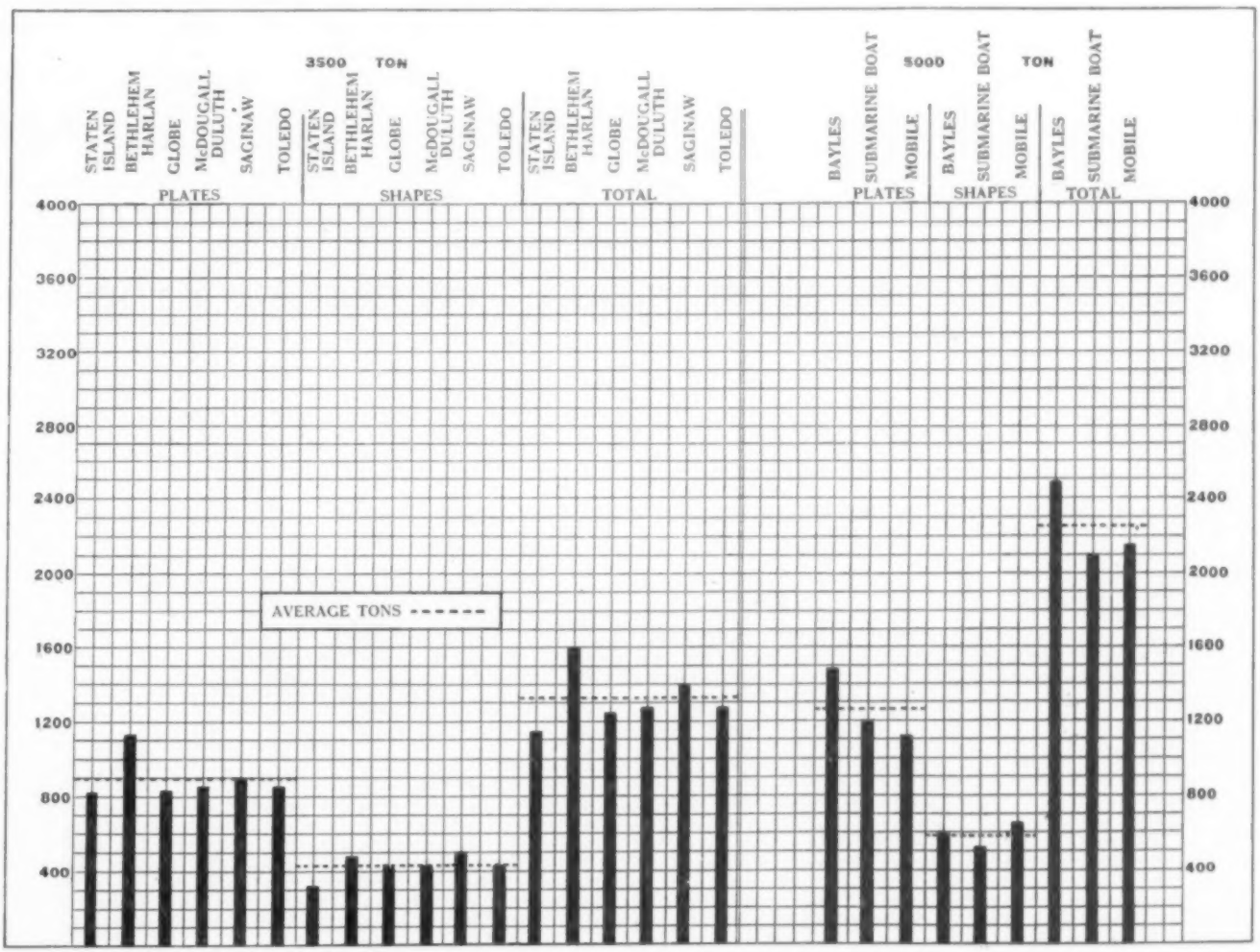
The accompanying chart prepared by the steel ship division from estimates submitted by the shipbuilders shows the difference in the tonnages asked for by the builders for the same sizes of ships. The Saginaw Shipbuilding Co., building 3500-ton cargo vessels asked for a little more than 1400 tons of steel per vessel while the Staten Island Shipbuilding Co., reported it needed a little more than 1150 tons for the same type of vessel. This illustration is typical of the differences in the estimates which it is assumed by the officials of the Emergency Fleet corporation are due to the desire of some builders to allow too much as a safety factor, or "buffer."

Three representatives of the steel ship division were sent to the district offices. These men checked up with the officials of the yards the actual tonnages required and submitted a report to the supply division which will be used as a basis of apportioning stocks and revising requirements so as to distribute the supply of steel to the best advantage.

This is expected to relieve the home office of the steel ship construction division of a great deal of detail in allotting steel.

The division announced that hereafter builders will receive only sufficient allotments for their actual requirements and that no builder will be allowed to accumulate an excess of material. The division will determine the tonnage of steel plates and shapes that should be allotted to each district for each month. It will then notify the district manager or district officer of this apportionment in order to have supplies divided by the district officer in accordance with the needs of the shipyards in his district.

Immediate delivery to the war manufacturing and the shipbuilding plants of the country of miscellaneous pieces of steel, known as lags, or odds and ends, is regarded as a move the steel mills and fabricating yards can make for both their own and the war program's advantage. It is not believed the tonnage is large. Many of the lags are of sizes seldom heard of in mills. To meet other essential deliveries this rolling has been put off until a more convenient time. The accumulation of these odds and ends has been largely due to the designing of innumerable types of ships. In the future this phase is expected to be reduced considerably, if not eliminated entirely, by the standardization of the several types.



VARIATION IN YARD ESTIMATES OF STOCKS OF STEEL PLATES AND SHAPES FOR 3500 AND 5000-TON CARGO SHIPS FOR EMERGENCY FLEET CORPORATION, DISCLOSED BY INVESTIGATION BY STEEL SHIP CONSTRUCTION DIVISION.

Allied Success Spurs Tool Builders

Increased Activity in Equipment Manufacture to Supply War Work's Demands is America's Only Answer to Germany's Peace Proposals—Absence of Large Lists is Coupled by Increased Miscellaneous Inquiry and Orders

GREAT impetus is being given to machine tool building in this country's industrial sectors by the allied successes on all fronts. Increased activity to supply the equipment demanded by war work is the only effect noticed by Germany's peace proposals. Even where some thought does exist regarding an end to the hostilities in the near future, there is a stern realization that a difficult road must be traversed before the way to peace is blasted through the heavy fortifications and huge defense works on German soil. The war department's request for a deficiency appropriation of $7,000,000,000 foreshadows the placing of additional war orders at an early date and bespeaks no early end of the country's win-the-war effort. A recent appropriation is being used to purchase machine tools for the Rock Island, Ill., arsenal and the Frankford, Pa., arsenal is to have an addition that will cost $1,000,000 and necessitate the purchase of more equipment. No announcements are being made regarding the Neville island ordnance plant equipment.

Without doubt every order being placed for equipment has a war flavor. Without it, priority ratings which insure satisfactory transportation, could not be obtained. While miscellaneous equipment comprises the demand in all markets, no concern is felt over the absence of larger lists. One item of interest in the east is the requirement of the Midvale Steel & Ordnance Co., for its Nicetown, Pa., gun plant. This aggregates about 80 tools. A large list is anticipated for its rifle plant at Eddystone, Pa., since increased production is necessary. It recently celebrated its first anniversary by producing rifle No. 1,000,000.

Deliveries continue to be matters of chief concern. Tool building plants are filled up with business to capacity and every energy is taxed to the limit to supply the miscellaneous demand. On smaller tools 30 to 60-day deliveries are given but on the larger machines, three to six months are the best deliveries obtainable. One Pittsburgh plant is out of the market except on stock sizes of small tools. All of its production is going to the American gun-relining plant in France. The same proposition of deferred deliveries is the difficulty in Canada. Some munitions plants are unable to operate because they cannot obtain the necessary equipment. Inquiries are received in the United States from time to time and several tool dealers recently visited this country in an endeavor to round up some shellmaking material. Their efforts met with little success. For the past year, the imperial munitions board has assigned contracts for shells, averaging $30,000,000 monthly and there is every indication that this rate will be continued for some time, so great are the needs of the armies in France.

Lulls are noted in railroad and shipbuilding inquiry for both machine tools and cranes. Used machinery dealers report an active market but continued difficulty in locating desired tools.

"Full Speed Ahead" is to be Governments Program

INSPIRING news from the western front and the Balkans has only tended to add further zest to the efforts of eastern machine tool manufacturers. While the end of the war may possibly be in sight, all fully realize that there is a difficult road yet to travel; that as the allied and American armies enter German territory, with its huge fortifications and vast net work of defense, it will be necessary for them to "blast" their way on a more extensive scale than ever before.

That this country is preparing for such a contingency is fully evinced by the recent request of the war department for a deficiency appropriation of $7,000,000,000 in which it was indicated that a tremendous amount of war work is yet to be assigned to manufacturers, particularly in the way of additional shell contracts and orders for new artillery. Large contracts recently assigned and projects now under way give further evidence of the government's intention of running "full speed ahead" until the final day, when a satisfactory peace shall be declared.

At the present time, demand in the eastern machine tool market is comprised chiefly of small, miscellaneous inquiries. Aside from the tentative inquiry of the Baldwin Locomotive Works, the largest list to come out in the east is that of the Midvale Steel & Ordnance Co., which involves about 80 machine tools for the new plant at Nicetown, Pa. The Midvale Steel & Ordnance Co. is also expected to bring out a new list shortly for its rifle plant at Eddystone, Pa. A $1,000,000 addition will be erected at the Frankford, Pa., arsenal, for which some new equipment will be required. The Bridgeport Tool & Machine Co., Rochester, N. Y., is inquiring for a few tools for a new addition, and the Eastern Machinery & Equipment Co., Camden, N. J., is also figuring on a small amount of miscellaneous equipment. Demand from the railroads and shipyards at this time is comparatively quiet.

The electric crane market continues to undergo a lull in demand. Included in recent orders are four 1½-ton jib cranes for the Air Nitrates Co., New York, which is in charge of constructing two government explosive plants in Ohio. The cranes will be furnished by the Gilbert Grant Co., Plainfield, N. J. The Sun Shipbuilding Co., Chester, Pa., has placed two 10-ton overhead cranes with the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y. The Wharton Steel Co., Wharton, N. J., has also bought a 10-ton overhead crane.

Arsenal Buying Interests Chicago

BUYING of machine tools in Chicago for the Rock Island arsenal and in less measure for concerns engaged in manufacturing various munitions forms the greater part of present demand. The recent appropriation for equipment for the arsenal is being used, the machinery being bought direct, without red tape. The International Harvester Co. is in the market for single purpose lathes and knurling machines for use in the manufacture of gas shells. The Kohler Co., Kohler, Wis., is also engaged on gas shells and has bought some equipment. Cribben & Sexton, Chicago, who have transformed part of their stove foundry into a shell shop, are still in the market for some of their equipment. J. C. Deagan,

AGATHON STEELS
TRADE MARK

The illustration shows one of our giant charging machines. It's electrically operated like all of the machinery throughout our plant and saves hours of labor. It's only through these modern methods that we have been able to supply the ever increasing demand for Agathon Alloy Steel.

The Central Steel Company
Massillon, Ohio, Agathon City

SALES OFFICES.

Detroit Office—326-27-28 Ford Bldg. F. Walter Guibert, District Representative.
Cleveland Office—Hickox Bldg. The Hamill-Hickox Company, District Representatives.
Chicago Office—1370 People's Gas Bldg., 122 South Michigan Blvd. C. H. Beach, District Sales Mgr.
Philadelphia Office—603 Widener Bldg. Frank Wallace, District Sales Mgr.
Syracuse Office—621 University Block. T. B Davies, District Sales Mgr.
Export Dept.—20 Broad St., New York.

AGATHON
Alloy Steels

"AGATHON" Chrome Nickel
"AGATHON" Chrome Vanadium
"AGATHON" Nickel Steels
"AGATHON" Special Analyses
"AGATHON" Vanadium
"AGATHON" Chrome Steel
"AGATHON" High Carbon

turing parts of gun sights. The Burlington railroad has issued a small list to fill in equipment which was not bought on the recent larger list. Railroads are not active at present, and the closing of the New York Central list in the east was the last transaction of importance in this line. Prices are stiffening steadily, with advances being announced almost weekly. The Ryan Car Co., Hegewisch, Ill., is preparing to build one unit of an enlarged plant, which will be carried much further if government permission is obtained. The John Ramming Machine Co., St. Louis, is building a 4-story addition to its machine shop. The Memphis Gas & Electric Light Co. will build an addition to its coke plant, consisting of 27 ovens. The U. S. Crane Co., 1234 Peoples Gas building, Chicago, has been given an order for 22 locomotive cranes of the type it has recently developed, for the bureau of yards and docks, navy department. This will cover its production until May 1, 1919.

The government lighthouse superintendent, Milwaukee, is taking bids until Oct. 10, at 2 p. m., for the following: Proposal 6088, one belt-driven air compressor, capacity about 110 cubic feet per minute; proposal 6089, one belt-driven air compressor, 150 cubic feet per minute; proposal 6090, one electric motor-driven air compressor, 110 feet per minute.

No Worry Over Absence of Big Lists

DEALERS in machine tools in the Cleveland territory report that makers are so filled up with orders, they are not at all worried over the absence of big lists Dealers are content to answer the inquiries for small lots of equipment to the best of their ability. The orders they are taking at present in most instances call for one, two, three or four machines. On small machines 30 and 60-day deliveries are possible but on the larger machines which are in heavy demand for shell and gunmaking, longer time deliveries only are given.

Machine tool salesmen are keeping closely in touch with the shops in the northeastern Ohio territory which are likely to receive contracts for machining the district's share of the 33,000,000 semisteel shells to be ordered by the government but report an absence of activity in this connection. The Best Foundry Co., Bedford, O., is reported to have received a contract for some of these projectiles. It is thought by many that the government will follow its established precedent of ordering the work done in certain shops and then from data in its hands supply the machinery necessary, the government retaining title to the equipment. This was the course followed in connection with a contract given the C. & G. Cooper Co., Mt. Vernon, O., for marine engines for the Emergency Fleet corporation. It received notification to double its capacity. Its answer was that such action was impossible due to inability to obtain machine tools. The government obtained the machinery including a large boring mill and planer on December delivery by diverting it from some other user and the Cooper company's requirements were supplied with government-owned equipment.

Large planers, boring mills and lathes are in demand. The American Shipbuilding Co., bought recently a boring mill which was billed at slightly less than $10,000. A fair sized list has been issued by the Craig Tractor Co., Cleveland, and some orders have been placed. These include milling machines, lathes, etc. The Aultman & Taylor Machinery Co., Mansfield, O., has been in the market but is understood to have postponed placing its orders. The National Lamp Works of the General Electric Co., is in the market for a 14-inch x 6-foot engine lathe and the American Steel & Wire Co., is asking for a few tools. The American Rolling Mill Co., Middletown, O., has taken over the contract for gun carriages awarded the Mosler Safe Co., Hamilton, O., and will conclude the work for the government at Hamilton. A lull has come in railroad buying, although the Nickel Plate issues small lists from time to time. At present it is asking for one 18-inch side arm lathe, with backing-off attachment, and one 3-head bolt cutter with capacity up to 1¼ inches.

Inquiries for shellmaking and other equipment come from Canada, but hold little of interest, since capacities are taxed to the utmost to supply this country's demand. The T. E. Bissell Co., Ltd., Elora, Ont., desires one bolt cutter of ½ to 1½-inch capacity.

Miscellaneous inquiries are plentiful. The Equipment Mfg. Co., Cleveland, desires a power hammer to forge ¾ x 1-inch to a round. The Marshall Foundry Co., Pittsburgh, desires one 12-foot x 24-foot table planer with two heads and one 84 x 84-inch x 14 to 18-foot planer, with two side heads and two heads on rail complete, either direct or belt driven. F. W. Niebling & Co., Cincinnati, is building a new machine shop and desires two lathes between 30 and 40-inch swing with no less than 15 feet between centers, one 60 x 60-inch, 14 to 18-foot planer, a 24-inch stroke shaper, one small drill grinder, one Jones & Lamson turret lathe with a 3 or 3½-inch hollow spindle. Peck, Stowe & Wilcox Co., Cleveland, is asking for one wall radial drilling machine. The Holmes Automobile Co., Canton, O., is understood to be in the market for machinery to make wire-carrying trucks.

Used machinery is in constant demand. The U. S. Piston Ring Co., Cleveland, wants a No. 200 or No. 210 Heald ring grinder. The Gray Machine Tool Co., Buffalo, wants either new or used machinery as follows: One 36-inch Fellows gear shaper, one horizontal boring mill, 2½ or 3-spindle, one 24 x 24-inch x 8-foot or 30 x 30-inch x 10-foot planer and one 20-inch drill with automatic feed. The Michigan Malleable Iron Co., Detroit, is inquiring for a 60-inch Lodge & Shipley pulley lathe.

Pittsburgh Sold Up

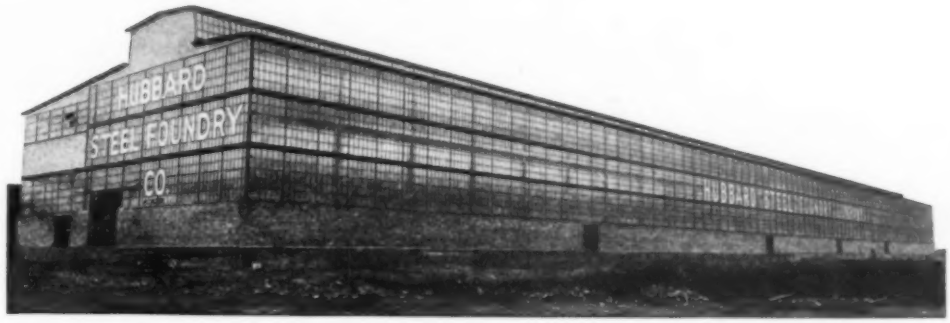
NO big orders for machinery or machine tools have come out in the Pittsburgh district during the past week and if there have been any new lists or inquiries they have been carefully guarded. Reasons for this secretiveness are not hard to find. Almost all of the current business is in connection with government work and as those taking any contracts for supplies for Neville island are strictly forbidden to divulge any details, it may be assumed safely that similar instructions go along with other government contracts. Some inquiries go only to a few builders and information in advance of the placing of the contracts is withheld. The Neville island gun plant buildings still are for the most part on paper and until construction is fairly under way, it is probable details about equipment will be withheld.

Builders almost without exception are well sold ahead and it is unusual to find any of them who can make deliveries on any line short of 60 days and in most cases five to six months are the shortest dates. One large machinery company is out of the market, save on stock supplies of small machines and tools, for it is heavily engaged in providing the equipment for the gun relining plant for American forces in France. Those concerns whose capacity is not so completely engaged are disinclined to book orders unless they are needed in connection with essential work and can be accompanied by high priority ratings.

Canadian Demand Is Pressing

DEMAND in Canada for machine tools continues to be exceedingly pressing. It is reported from Ottawa that large contracts will continue to be awarded by both the United States and British governments for war material, shells, etc. During the past year the imperial munitions board placed orders for shells averaging about $30,000,000 per month, and it is understood that this average will be continued for some time to come. These munitions contracts which continue to be placed in such large volume in the Dominion, are keeping the machine tool builders always on edge to supply requirements, which are now greater than they have been for some time past. The securing of delivery of machines is one of the greatest difficulties the machine tool trade has to deal with just now. It has been a serious item for some time, and the chances are that it will continue so. A few munitions plants are unable to go ahead with the manufacture of shells on account of being unable to get tools. In order to secure a greater volume of tools of a general character, both those that are now on order and some additional equipment, which is required, a few Canadian dealers have gone to the United States to gather together as many tools as they can, if these can be secured they are looking forward to receiving permission to have them shipped across the line as soon as possible, in order to offset at least a part of the demand which is so pressing just now. They have not met with much success since all equipment is needed in the United States.

WAR with ROLLING MILL JIM



Say Fellows!—I've been so busy haven't had time to give you any new dope. It's "UNCLE SAM" first, last and all the time these days. Here's to beat the Hun!

So long,

Rolling Mill Jim.

Hubbard Steel Foundry Co.

EAST CHICAGO, IND.

All Kinds of Iron and Steel Rolls and Steel Castings.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

PITTSFIELD, ME.—The American Woolen Co., Boston, has let the contract for a brick, 3-story addition to its mill.

PORTLAND, ME.—The Bradley Lumber & Mfg. Co. has been incorporated with $1,500,000 capital by Virgil C. Wilson and Thomas L. Talbot.

LUDLOW, VT.—The Jewell Brook Woolen Co. has let the contract for a brick, mill construction, 1-story, 30 x 66-foot addition.

BARRE, MASS.—The Charles G. Allen Co., iron founder and machinist, will rebuild buildings recently damaged by fire.

BOSTON—The Suffolk Mfg. Co. has been incorporated to make chemical products, auto appliances, etc., with $20,000 capital by Frazier L. Davis, Mario L. Felkin and N. T. Connor.

BOSTON—The Gillette Safety Razor Co. will start work at once on the construction of a $500,000 plant addition. The largest building will be eight stories, 74x167 feet.

LOWELL, MASS.—A $40,000 roundhouse and repair shop will be erected here by the Boston & Maine railroad. The H. Wales Lines Co., Meridan, Conn., has the general contract.

ORANGE, MASS.—A 1-story, 60 x 100-foot plant addition will be erected for the Leavitt Machine Co. by James McKenna, general contractor.

SPRINGFIELD, MASS.—The general contract for the erection of a boiler house and hardening shop has been awarded by the Hendee Mfg. Co. to E. J. Pinney, this city.

WORCESTER, MASS.—Plans have been figured for a brick boiler house for the Rockwood Sprinkler Co. of Massachusetts.

WORCESTER, MASS.—The Wyman-Gordon Co. has let the contract for a brick, 1-story, 60 x 180-foot storehouse, and a 1-story, 40 x 80-foot addition to its 2-story testing laboratory building.

EAST PROVIDENCE, R. I.—The Rumford Chemical Works has let the contract for a brick, mill construction, 1-story.

EAST PROVIDENCE, R. I.—An $18,000 addition will be erected to the plant of the Rumford Chemical Works. The proposed structure will be 1-story, 50x252 feet, and will be built by William Merchant, Inc.

GREENWICH, R. I.—The Greenwich Mills let the contract for a brick, mill construction, 1-story, 60 x 90-foot weave shed and a 1-story, 12 x 50-foot storage building.

HILLSGROVE, R. I.—The Rhode Island Malleable Iron Works is to build a reinforced concrete and brick, fireproof, 2-story, pattern storage building in addition to a 100 x 200-foot foundry to replace the buildings recently damaged by fire.

PROVIDENCE, R. I.—The New England Supply Co. has let the contract for a brick, mill construction, 1-story, 62 x 192-foot with a 43.4 x 14.8-foot projection factory and a 64 x 30-foot boiler house.

WARWICK, R. I.—The Rhode Island Malleable Iron Works has awarded to C. W. Carlson, Providence, a contract for a $35,000 plant addition. A foundry 1-story, 100x200 feet, will be included.

ANSONIA, CONN.—The Ansonia Mfg. Co. has let the contract for a mill construction, 1-story, 50 x 142-foot factory, to cost $15,000.

BRIDGEPORT, CONN.—The Paterson Forge Co. has been incorporated with $50,000 capital by James Paterson, Harold Paterson and Walter Paterson.

BRIDGEPORT, CONN.—The Crane Co. has let the contract for a brick and concrete, 400 x 400-foot addition to its West End plant.

HARTFORD, CONN.—The Hartford Special Machine Co. has placed a contract with R. G. Bent for the erection of several small storage buildings.

MYSTIC, CONN.—The New Bedford Dry Docks Co. has been incorporated with $200,000 capital by Mark L. Gilbert, Louis Lubchansky, New London, Conn., and Frank H. Meader, Stonington, Conn.

PORTLAND, CONN.—The Portland Foundry Co., a subsidiary of the Baird Machine Co., Bridgeport, Conn., has purchased several acres on which it will erect several buildings.

WEST HARTFORD, CONN.—The Ainsigе Machine & Tool Co. has let the contract for a brick, 1-story, 50 x 106-foot factory.

Along The Atlantic Coast

BELL ISLAND, N. Y.—Work has started on the erection of a $60,000 car repair shop for the New York Central railroad.

BUFFALO—Preliminary plans are being perfected by the United States Drawn Steel Co. for a plant addition. The J. W. Cowper Co. will be in charge.

BROOKLYN, N. Y.—The Vulcan Rail Construction Co. will build a $10,000 warehouse, two stories 90x118 feet.

Government Inquiries

BIDS on the following equipment are desired by the navy department, bureau of supplies and accounts:

One upright drill, to 1½-inch diameter, one emery grinder, one 16-inch engine lathe, one 15-inch stroke shaper, four vises, machinists' bench, swivel, stationary, one 26-or 30-inch band saw, direct connected, motor driven and one each lever punch, lever shear and wood trimmer, 1970, Puget Sound.

Two slotting machines and five lathes, 1975, South Charleston, W. Va.

Two engine lathes, 5781½, Newport.

Machine tools, including grinders, pipe machines, drills, etc., 5877½, Chelsea, Mass.

Screw sets, tools and equipment, 5907½, Newport.

One milling machine, 6033½, Puget Sound.

Machine tools, 6034½, Philadelphia.

Engine lathes, 6035½, Charleston.

One grinder and one motor, 6036½, Philadelphia.

One drill press, 6038½, Charleston.

One power hammer, 6041½, Puget Sound.

Corrugating and beading machine, 6065½, Norfolk.

One woodworker's lathe, 6084½, Brooklyn.

Two press drills, 6168½, Philadelphia.

Seven planers and jointers, 6169½, Brooklyn.

Woodworkers' lathes, 6176½, Brooklyn.

One drill, 6206½, Charleston.

Machine tools, 6268½, Brooklyn.

Schedule numbers, dates of opening and places of delivery follow the specifications of the tools.

BROOKLYN, N. Y.—Plans are being drawn by Architect C. A. Kunzi, Middle Village, for a $35,000 factory for the Soss Mfg. Co., 435 Atlantic avenue, Brooklyn. The building will be three stories, 50 x 130 feet.

BUFFALO.—The King Sewing Machine Co. contemplates the erection of a $10,000 plant addition. Architects R. J. Reidpath & Son, are drawing plans.

BUFFALO—A contract for the erection of a 1-story, 80x160-foot trimming building has been awarded by the Aluminum Castings Co. to the Chaaf Co.

BUFFALO—The Monarch Knitting Co., Inc., will erect a 1-story, 30x54-foot boiler house and 1-story, 55x111-foot dye shop at its plant in this city. W. E. S. Dryer, Philadelphia, is engineer in charge of construction.

FLUSHING, LONG ISLAND, N. Y.—Thomas C. O'Conner has purchased property for the establishment of a plant on which to build barges for the government. The barges will be 110 feet long, of 30-foot beam.

NEW YORK CITY—The Hooper-Falkenau Engineering Co. has completed plans for a $20,000 foundry for the Lansdale Foundry Co. The proposed plant will be one story, 52x130 feet.

NEW YORK CITY—Westinghouse, Church, Kerr & Co., 37 Wall street, are drawing preliminary plans for a 3-story, 200x600-foot extension to the plant of the General Chemical Co. in Baltimore. The proposed addition will cost approximately $200,000.

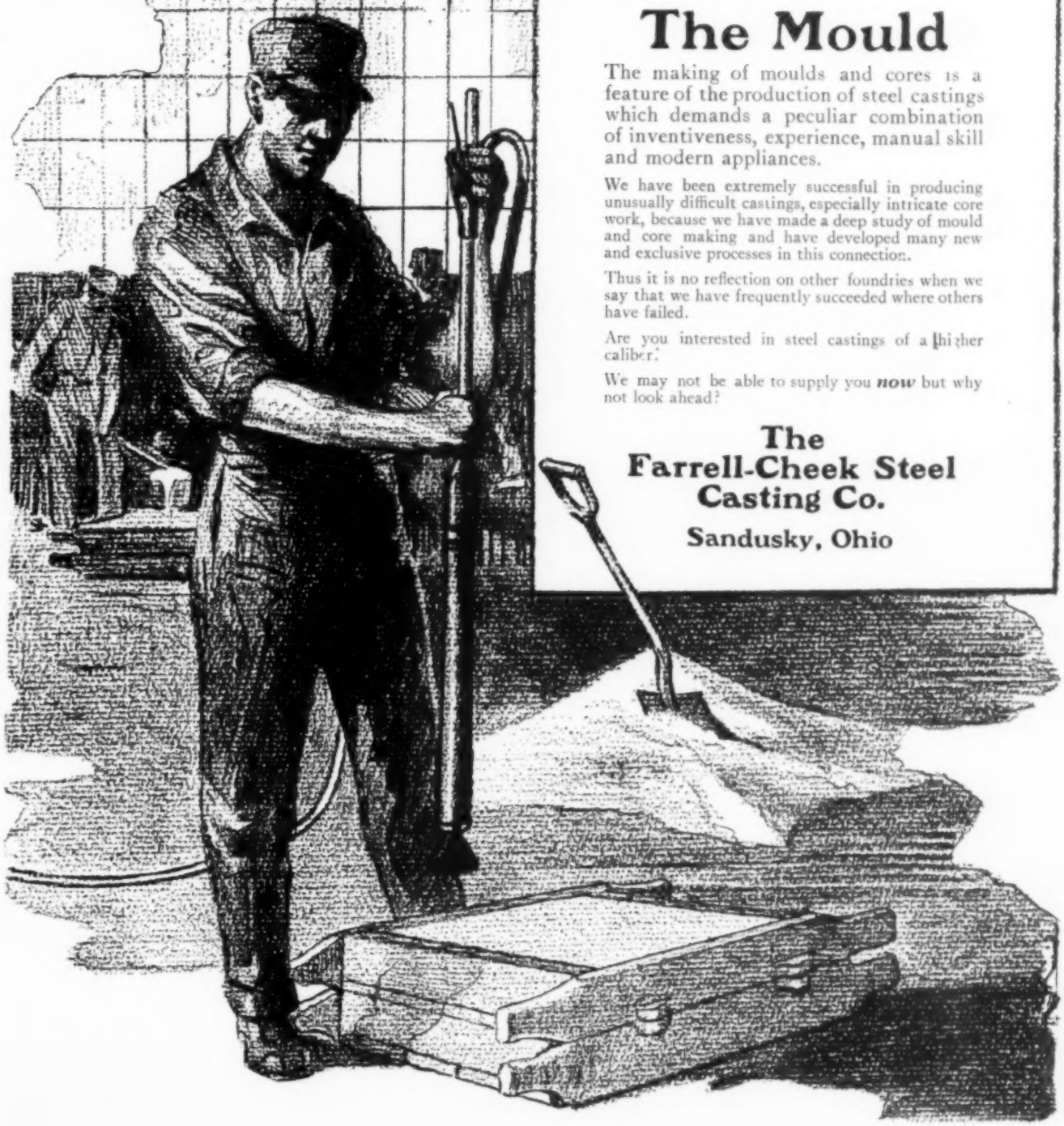
NIAGARA FALLS, N. Y.—Bids are now being received by the Republic Carbon Co. on the erection of four factory buildings at its plant. Three of the buildings will be one story, 48 x 100 feet, 90 x 144, and 80 x 340 feet, respectively.

PIERMONT, N. Y.—A 2-story, 100 x 250-foot addition will be erected at the plant of the Robert Cair Co., 50 Washington street, Brooklyn. The general contract has been awarded to the Turner Construction Co., 244 Madison avenue, New York City.

ROCHESTER, N. Y.—The Eastman Kodak Co. is

FARRELL

STEEL CASTINGS



The Mould

The making of moulds and cores is a feature of the production of steel castings which demands a peculiar combination of inventiveness, experience, manual skill and modern appliances.

We have been extremely successful in producing unusually difficult castings, especially intricate core work, because we have made a deep study of mould and core making and have developed many new and exclusive processes in this connection.

Thus it is no reflection on other foundries when we say that we have frequently succeeded where others have failed.

Are you interested in steel castings of a higher caliber?

We may not be able to supply you ***now*** but why not look ahead?

The Farrell-Cheek Steel Casting Co.

Sandusky, Ohio

drawing plans for a 4-story factory building. C. K. Flint, of the Eastman company, is engineer.

ROCHESTER, N. Y.—The general contract for a machine shop addition, to be erected at the plant of the Bridgeford Tool & Machine Co., has been awarded to the Crowell-Lundoff-Little Co., Cleveland. The addition will be three stories, 100 x 170 feet.

SHERBOURNE, N. Y.—The August Knitting Co. has postponed plans for erecting an addition to its mill here.

TONAWANDA, N. Y.—The Pierce Arrow Motor Car Co. is receiving bids on the construction of three plant additions. One building will be a testing shop, another a reassembling shop and the third a boiler house.

Business Changes

REBUILT and enlarged, the machine shop formerly used by the Keller Pneumatic Tool Co. at Fond du Lac, Wis., now is housing the Wells Mfg. Co., ignition, magneto and transformer coils, timers, generators and farm lighting plants. This latter company has some large government contracts.

The Wisconsin Duplex Auto Co., which established its permanent plant in Oshkosh, Wis., several months ago, has changed its corporate style to Oshkosh Motor Truck Mfg. Co., and its product henceforth will be known as the Oshkosh motor truck.

The Booth-Hall Co., Chicago, electric furnace builder and metallurgist, has moved its sales and administrative offices from 565 West Washington boulevard to 2309 Archer avenue, where only the engineering and construction departments heretofore have been located.

The Bettendorf Co., Bettendorf, Ia., has closed its sales offices in Chicago and New York, and business formerly transacted there will be transferred to the Bettendorf office.

The Cleveland office of the Heald Machine Co., Worcester, Mass., has been removed from the Engineers building to 1102 Swetland building.

The F. O. Stallman Supply Co., San Francisco, machine tool dealer, has moved from 129 First street to a new building at First and Natoma streets.

The Bettcher Mfg. Co., Cleveland, has changed its name to the Bettcher Stamping & Mfg. Co., in order to designate clearly the character of its product, namely, metal stampings.

The Independent Pneumatic Tool Co., Chicago, has moved its office from the Thor building to 600 West Jackson boulevard.

The Ayer & Lord Tie Co.'s wood block business has been taken over by the Republic Creosoting Co., Indianapolis.

The Hoffman Bros. Motor Truck Co., Omaha, has leased the Sun Motor Co.'s plant at Elkhart, Ind., and will use it for the production of motor trucks.

LEBANON, PA.—The Lebanon Steel Foundry Co. plans the construction of an addition to its plant, and has retained A. R. Richter, Reading, Pa., as architect.

MARCUS HOOK, PA.—The National Aniline & Chemical Co., New York, has awarded the contract for a 106 x 196-foot plant addition.

MILTON, PA.—The American Car & Foundry Co. has awarded a contract to the Austin Co., Philadelphia, for the construction of an 83 x 100-foot plant addition.

PHILADELPHIA.—The American Insulation Co. has purchased adjoining property at a cost of $22,000 for further plant expansion.

PHILADELPHIA.—Puckert & Wunder, architects, 310 Chestnut street, are drawing plans for a 1-story machine shop for a company whose name is withheld.

PHILADELPHIA.—The William Cramp & Sons Ship & Engine Building Co. contemplates the erection of a $100,000 engine house, two stories, 306 x 400 feet.

PHILADELPHIA.—The navy department is having plans prepared for two buildings, a machinery and electrical shop and a pattern shop, for the Philadelphia navy yard.

PHILADELPHIA—The contract for reconstruction of a plant building, recently damaged by fire, has been awarded to R. J. Whiteside & Sons by the Westmoreland Chemical Co.

PHILADELPHIA—Bids will be taken soon by the quartermasters department on the construction of a $200,000 carpenter shop. Major Hillis Hackendorf, Franford Arsenal, is in charge.

PHILADELPHIA—Stone & Webster, Boston, are drawing plans for a 1-story power plant, 380x400 feet. H. J. Strobel, 916 Chestnut street, Philadelphia, is in charge.

POTTSTOWN, PA.—The North American Motors Co. will erect a $20,000 addition to its plant in this city. The structure will be 1-story, 80x90 feet. The Austin Co., Philadelphia, will be in charge.

WILKESBARRE, PA.—Westinghouse, Church, Kerr & Co., 37 Wall street, New York City, are drawing plans for a power plant for the Vulcan Iron Works, this city.

YORK, PA.—The General Machine Works is having plans drawn for a $14,000 addition.

BLOOMFIELD, N. J.—The International Arms & Fuse Co. will build a 1-story addition to its plant.

CAMDEN, N. J.—The Eastern Machinery & Equipment Co. is receiving bids on a 2-story machine shop, 45 x 110 feet.

CAMDEN, N. J.—The B. F. Boyer Co., Philadelphia, is taking bids on the construction of a 1-story brick and steel warehouse, 75 x 105 feet.

CAMDEN, N. J.—F. H. Beaumont Co., Philadelphia, will build a 1-story factory building, 50 x 200 feet.

CAMP DIX, N. J.—The American Catholic War Council, New York, will have a recreation building, brick, 120 x 136, erected here.

CHROME, N. J.—The American Agricultural Chemical Co., New York, has let a contract to the Turner Contracting Co., New York, for the erection of a 2-story factory building, 101 x 227 feet.

ELIZABETH, N. J.—The Bayway Chemical Co., 2 Rector street, New York City, is having plans drawn for a $15,000 factory building.

EAST ORANGE, N. J.—The Sprague Electric Co. is having plans drawn by Arthur B. Marsh for a $17,000 pattern shop and storage building. The proposed structure will be two stoies, 60 x 163 feet.

HACKENSACK, N. J.—The Liberty Storage Battery Co. has been incorporated with $700,000 capital to manufacture storage batteries. William Hughes, Newark, N. J., is one of the incorporators.

HOBOKEN, N. J.—Federal Dry Dock & Repair Co. has been incorporated with $3,000,000 capital to build docks, etc. Kenneth B. Halstead, New York, is one of the directors.

JERSEY CITY, N. J.—The Builders Hoist & Machine Co. will erect a $10,000 storage building at its plant. Gillespie & Barlow, 520 West Twenty-fifth street, New York City, have been awarded the general contract.

KEARNEY MEADOWS, N. J.—Plans for a $2,000,000 machine tool plant, to be erected by the Niles-Bement-Pond Co., 111 Broadway, New York City, have been placed in abeyance.

MONTVILLE, N. J.—The Montville Finishing Co., Bloomfield avenue, has let a contract for a 2-story factory addition, 50 x 135 feet.

NEWARK, N. J.—Maas & Waldstein plan to build a boiler house to cost $50,000.

NEWARK, N. J.—The General Electric Co., Boyd street, will make alterations to its power plant.

NEWARK, N. J.—F. Silberman has let a contract for the erection of a brick and steel laundry building, 22 x 224 feet.

NEWARK, N. J.—The Columbus Crystal Co. will erect a storehouse and factory building, 100 x 185 feet.

NEWARK, N. J.—The Rogers Pyatt Shellac Co. has had plans drawn for 1-story addition to its plant on Essex street.

NEWARK, N. J.—The Oxweld Acetylene Co., Chicago, has awarded a contract for an extension to its plant in this city to Frederick Kidgus, Inc.

NEWARK, N. J.—Work will be started soon on a manufacturing plant in this city for C. F. Massey & Co., Chicago. The proposed plant will be one story, 40x150 and 70x216 feet.

PASSAIC, N. J.—The New York Belting & Packing Co. has awarded a contract to the J. W. Ferguson Co., Paterson, N. J., for the erection of a brick and steel boiler and pump house, 60 x 150 feet.

PATERSON, N. J.—The Royal Hasco Co., Inc., will start work soon on the construction of a $22,000 addition to its dye works.

PERTH AMBOY, N. J.—A $90,000 extension will be made to the plant of the Standard Oil Co. in this city. The H. D. Best Co., 949 Broadway, New York City, will be in charge of the construction.

TRENTON, N. J.—The Delfon Tire & Rubber Co., Whitehead road, has increased its capital stock from $700,000 to $1,000,000 and will use the proceeds to extend and improve its plant.

Central States Activities

BARRON, WIS.—Bids will be taken by the board of public works for the construction of an addition and the installation of a hydro-electric equipment in the municipal light and power plant.

BIRON, WIS.—L. A. DeGuere, consulting engineer, Grand Rapids, Wis., has been engaged by the Consolidated Water Power & Paper Co. of that city to design and supervise the construction of a brick and steel paper mill and hydro-electric power plant addition at the Biron plant.

EDGERTON, WIS.—The common council has awarded a contract to Lee Alder, Edgerton, for building a double-span steel bridge, with a 43-foot waterway, over Saunders creek at High street.

FOOTVILLE, WIS.—The Clark Garage Co. will re-

WSM

STEEL PLANT EQUIPMENT
COKE OVEN MACHINERY
GAS PRODUCERS
ORE AND COAL HANDLING MACHINERY
SPECIAL CRANES
MINING MACHINERY
HYDRAULIC TURBINES

The Hughes Mechanical Gas Producer

REPEAT ORDERS
Indicate Satisfaction

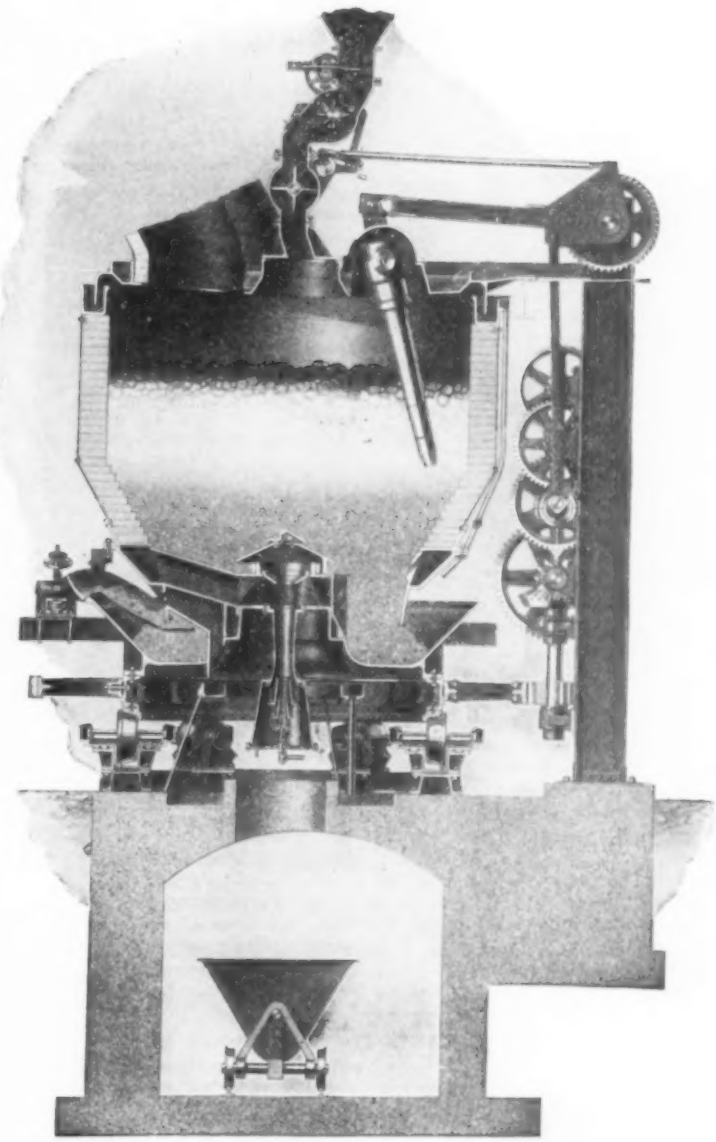
A partial list of repeat customers showing number of Hughes Producers used by each.

Carnegie Steel Co.	119
American Steel & Wire Co.	56
Bethlehem Steel Co.	54
New Jersey Zinc Co.	42
National Tube Co.	41
Jones & Laughlin Steel Co.	40
Lackawanna Steel Co.	39
Indiana Steel Co.	38
Inland Steel Co.	36
Minnesota Steel Co.	36
Pittsburgh Steel Co.	36
American Sheet & Tin Plate Co.	32
Republic Iron & Steel Co.	32
American Rolling Mill Co.	30
Corrigan, McKinney & Co.	30

More than 1000 in use

Write for Bulletin A-4

Bulletin A-4 contains considerable information on the subject of producer gas and explains the Hughes Uniform Feed, Water Cooled Poker, Blowing, Mixing and other special features which contribute to its splendid performance. A copy is waiting your request.



THE WELLMAN-SEAVER-MORGAN CO.

CLEVELAND, OHIO, U.S.A.

build its public garage and repair shop, recently damaged by fire. The building will be 40 x 75 feet.

GREEN BAY, WIS.—The Green Bay Foundry & Machine Co., Broadway and Arndt street, is building an addition.

HARTFORD, WIS.—The International Steel Products Co., First National Bank building, Milwaukee, will build a factory unit. Otto C. Unke, 1054 Third street, Milwaukee, is taking bids.

JANESVILLE, WIS.—A bond issue of $70,000 has been voted for building a bridge at South Jackson street.

KENOSHA, WIS.—The Appleton Construction Co., Appleton, Wis., is the lowest bidder for the erection of a school building here.

MADISON, WIS.—The Doble Heating System, Inc., Madison, has been incorporated with a capital stock of $25,000 by local interests to manufacture and install kerosene heating apparatus for domestic purposes. William S. Cargill is president.

MARINETTE, WIS.—The Northern Foundry Co. is building an addition to its foundry and will equip a machine shop.

MILWAUKEE—The Smith Engineering Co., 1154 Thirty-second street, will build a factory, 65x100 feet.

MILWAUKEE, WIS.—The Milwaukee Steel Foundry Co., 101 South Water street, is building an addition and will install a 3-ton electric furnace.

MILWAUKEE—The Universal Machine Tool Co., 784 Thirtieth street, manufacturer of machine tools, will build a machine shop. F. E. Gray, 40 Insurance Exchange building, is architect.

MILWAUKEE—A building permit has been granted to the Allen-Bradley Co., Greenfield avenue and Clinton street, for a 1-story fireproof addition, 64 x 90 feet, valued at $33,000. The company manufactures electric controlling devices, rheostats, etc.

MILWAUKEE—David Lupton & Sons Co., Philadelphia, will furnish the steel sash and glazing for a new chipping and annealing building costing $100,000, for the National Brake & Electric Co., foot of Belleview place, Milwaukee.

MONROE, WIS.—The H. W. Johns-Manville Co., Milwaukee, has been awarded the contract for a refrigerating plant, steam piping and boiler covering required for the new $50,000 cold storage plant of the Owners' Industrial Co. Architects C. F. Ringer & Son, Milwaukee, are in charge. L. E. Gettle is secretary.

RACINE, WIS.—The Hamiltoon Beach Mfg. Co., manufacturers of electrical supplies, is building a 3-story addition, 80x150 feet.

RACINE, WIS.—The Twin Disc Clutch Co., capitalized at $100,000, has been chartered to manufacture clutches and transmission parts by Julian Olds, Arthur B. Doe and J. A. Dietrich.

SHEBOYGAN, WIS.—The Standard Oil Co. will build a new engine house, loading platform and a new warehouse for its Sheboygan branch and distributing station.

SUPERIOR, WIS.—The Twin City Iron Works, St. Paul, has been awarded the contract for installing a steel fire escape on the Blaine school.

SUPERIOR, WIS.—A special election has been called for Oct. 8 to vote on the purchase by the city of the property of the Superior Water, Light & Power Co., and a bond issue of $100,000 for the construction of a municipal auditorium and armory building.

WEST ALLIS, WIS.—The North End Foundry Co. is building an addition, 60x80 feet.

WEST ALLIS, WIS.—The Gerlinger Steel Castings Co., Fifty-ninth and National avenues, is building a foundry, 80x184 feet.

DETROIT, MICH.—The Cubeco Steel Foundry Co., capitalized at $200,000, has been chartered by W. H. Struble, H. L. Bartram and George R. Cruis.

BELLEVILLE, ILL.—The Chemical Products Laboratory, capitalized at $25,000, has been chartered by Henry Wrape, Harold J. Wrape, Carl Hambuchen, William C. Schramm and Joseph O'Neill.

CHICAGO—The Advance Forge & Tool Works, capitalized at $5000, has been chartered by Robert K. Greaves, Anna R. Reeder and Pauline Greaves.

CHICAGO—The Eureka Flux & Solders Co., capitalized at $2500, has been chartered by Emil Lesser, Abraham Gutmann and Frank Pipla.

CHICAGO—The K. & W. Railway Equipment Co., capitalized at $100,000, has been chartered by Herbert Haase, John C. Burchard and C. R. Sercomb.

CHICAGO—W. D. Allen & Co., T. L. Ryerson manager, 563 West Lake street, will build a plant 100 x 300 feet. S. N. Crowen, 30 North La Salle street, is architect.

CHICAGO—The Crane Co., South Michigan avenue, has let a contract for a 1-story shop 100 x 448 feet, with an annex 50 x 90 feet and tunnel connecting with the boiler house, at its plant, Kedzie avenue and Forty-first street.

CHICAGO—The Ryan Car Co., William Ryan president, 332 South Michigan avenue, will build a plant costing $40,000 at Hegewisch, Ill. If government permits can be obtained the company will continue building to the extent of $400,000 or $500,000.

DECATUR, ILL.—The Mueller Metal Co., Adolph Mueller president, is building a refining plant, 200 x 300 feet.

DIXON, ILL.—The American Wagon Co., 1007 Lincoln avenue, will build a 2-story wagon factory, 80 x 90 feet.

MUNCIE, IND.—The Carpenter Machine Co., capitalized at $10,000, has been chartered to manu- C. Williams president, 900 West Lake street, manufacturer of pipe nipples, will remodel a 4-story malt facture machinery by Raymond A. Allen, Raymond E. Carpenter and G. Albert Carpenter.

On The Pacific Coast

SEATTLE—The Puget Sound Sheet Metal Works will erect a factory at 3631 East Marginal way.

SEATTLE—The Patterson-McDonald Shipbuilding Co. will begin construction of a forge shop at its yard.

SEATTLE—Engineers of the East Waterway Dock & Warehouse Co. have prepared plans for the construction of a reinforced concrete power house, 42 x 42 feet, at the plant of the Rogers-Brown Importing Co., on the East Water way.

SEATTLE—The port of Seattle commission has received word from Washington that the army quartermaster's department has approved a site on the northwest corner of Harbor Island for the location of the proposed government dock.

SEATTLE—The port of Seattle commission has requested permission from the capital issues committee to sell $1,990,00 in bonds authorized by the voters for the construction of a proposed pier at Smith Cove.

SEATTLE—Architect Francis W. Grant, Mehlhorn building, Seattle, has completed plans and will accept contractor's figures at once for the general contract in connection with the reconstruction of the Aurora Foundry on Horton street. The new building will be one story, 70 x 120 feet and will contain electric furnaces and a large traveling crane.

SPOKANE, WASH.—The General Machinery Co. contemplates an investment of $50,000 in the enlargement and equipment of its plant at Riverside avenue and Freya street, according to announcement of E. J. Simons, general manager. Additional ground recently purchased will probably be occupied by the foundry and machine shops.

CRESCENT, ORE.—Development of a power site here has been undertaken by N. E. Winnard, of Heppner, power to be used in pumping water on lands in the Fort Rock district.

PORTLAND, ORE.—The Northwest Steel Co. has leased a strip, 24 x 120 feet, in South Portland and plans the erection of a machine shop.

LOS ANGELES—The Salt Lake Railway, Pacific Electric building, will build a steel tank car repair shop, 195 x 200 feet.

LOS ANGELES—The Smith Bros. Motor Co., capitalized at $150,000, has been chartered to manufacture motors by S. W. Smith, J. L. Cadman and C. E. Fisher.

Business In Canada

NEW WESTMINSTER, B. C.—The Lumber Products, Ltd., Brunett street, will build an addition to its mills and instal new machinery.

NORTH VANCOUVER, B. C.—The William Lyall Shipbuilding Co. will build an addition to its shipyards, and construct a wharf, etc.

PORT COQUITLAM, B. C.—The Pacific Construction Co. will construct improvements to its plant including the construction of two new ways, blacksmith shop, etc.

VANCOUVER, B. C.—The Columbia Block & Tool Co., Smithe street, will build a steel foundry.

VANCOUVER, B. C.—The Hoffar Motor Boat Co., Georgia street, is having plans prepared for the erection of an airplane factory.

BRANTFORD, ONT.—Ker & Goodwin have received a contract from the United States government for the manufacture of 175,000 semisteel gas shells, to cost $1,500,000. The company will erect a new factory and will require considerable machinery and equipment.

HAMILTON, ONT.—The Steel Co. of Canada is erecting a new building.

HAMILTON, ONT.—Construction work is well under way and the building will shortly be ready for machinery for the Ford Smith Machine Co., Earl street.

HAMILTON, ONT.—Work has been started on the erection of a 3-story brick building for the Hamilton Steel & Iron Co.

INGERSOLL, ONT.—The John Morrow Screw Co., Thames street, will build a factory addition.

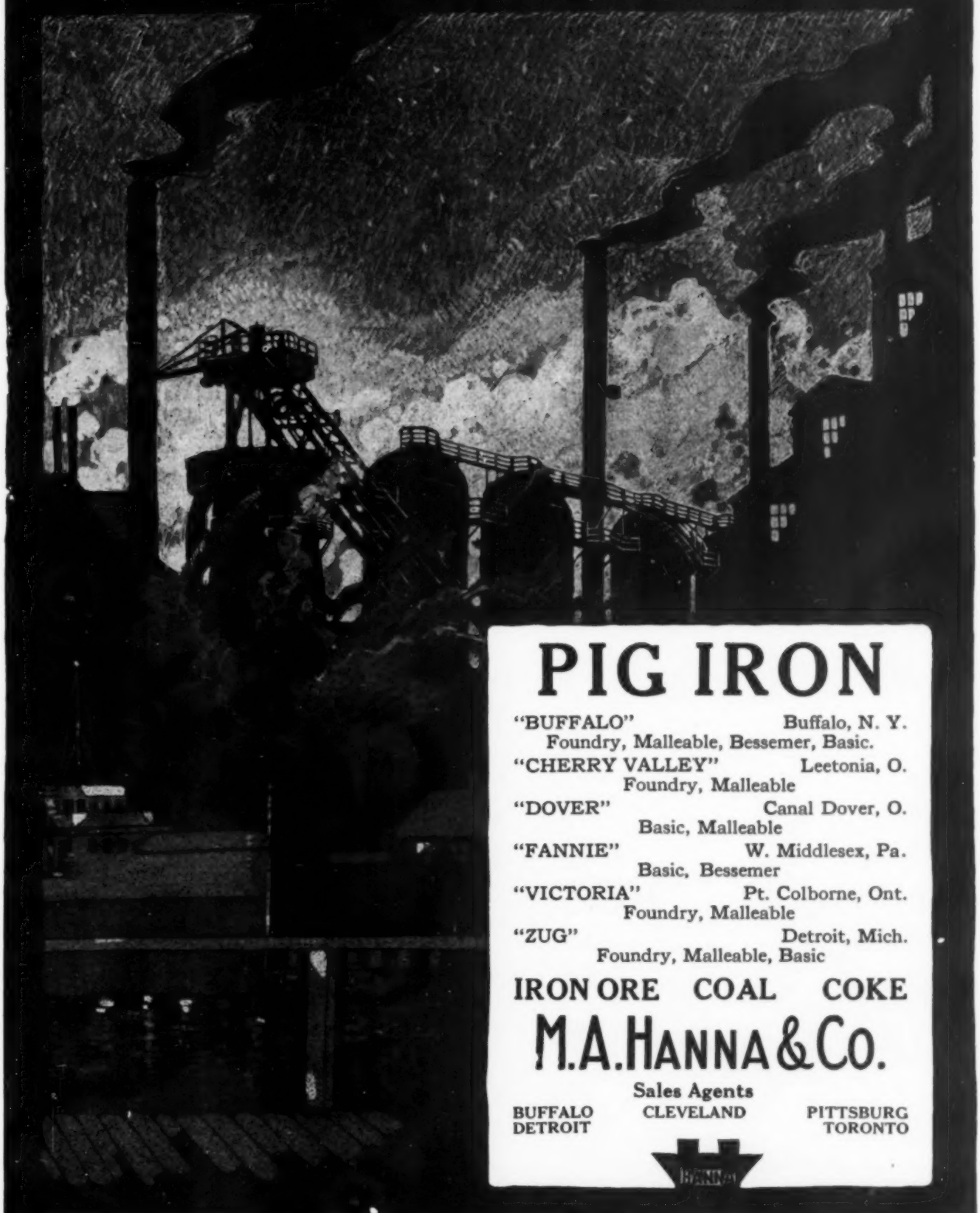
KIRKLAND LAKE, ONT.—The Burnside Gold Mines, Ltd., are in the market for a ball mill, of about 40 or 50 tons capacity, also electrical equipment, etc. C. A. Richardson is manager.

LONDON, ONT.—Gordon Philips, city hall, will build a factory.

PEMBROKE, ONT.—The Thomas Pink Co. will build a machine shop.

PORT HOPE, ONT.—The Allied Drug Co., St. Lawrence boulevard, will turn its present building into a factory and will require machinery, equipment, pulleys, etc. President, W. J. Fielding.

HANNA



PIG IRON

"BUFFALO" Buffalo, N. Y.
Foundry, Malleable, Bessemer, Basic.

"CHERRY VALLEY" Leetonia, O.
Foundry, Malleable

"DOVER" Canal Dover, O.
Basic, Malleable

"FANNIE" W. Middlesex, Pa.
Basic, Bessemer

"VICTORIA" Pt. Colborne, Ont.
Foundry, Malleable

"ZUG" Detroit, Mich.
Foundry, Malleable, Basic

IRON ORE COAL COKE

M. A. HANNA & CO.

Sales Agents

BUFFALO CLEVELAND PITTSBURG
DETROIT TORONTO

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports	
Old range Bessemer, 55 iron	$6.65
Mesabi Bessemer, 55 iron	6.40
Old range non-Bess., 51½ iron	5.90
Mesabi non-Bess., 51½ iron	5.75

WAREHOUSE PRICES

Steel bars, Chicago	4.17c
Steel bars, Cleveland	4.07c
Steel bars, Detroit	4.13c
Steel bars, Philadelphia	4.13c
Steel bars, New York	4.145c
Steel bars, St. Louis	4.24c
Steel bars, Cincinnati	4.13c
Steel bars, St. Paul	4.395c
Steel bars, Buffalo	4.10c
Iron bars, Buffalo	4.70c
Iron bars, Chicago	4.77c
Iron bars, Cleveland	4.67c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.84c
Iron bars, Cincinnati	4.13c
Iron bars, Philadelphia	4.73c
Iron bars, New York	4.745c
Shapes, Chicago	4.27c
Shapes, Detroit	4.23c
Shapes, St. Louis	4.34c
Shapes, St. Paul	4.495c
Shapes, New York	4.245c
Shapes, Cleveland	4.17c
Shapes, Philadelphia	4.23c
Shapes, Buffalo	4.20c
Shapes, Cincinnati	4.23c
Plates, Buffalo	4.45c
Plates, Chicago	4.52c
Plates, Detroit	4.48c
Plates, St. Louis	4.59c
Plates, St. Paul	4.745c
Plates, New York	4.495c
Plates, Cleveland	4.42c
Plates, Philadelphia	4.48c
Plates, Cincinnati	4.48c
No. 10 blue anl. sheets, Chicago	5.52c
No. 10 blue anl. sheets, Cleveland	5.42c
No. 10 blue anl., Buffalo	5.45c
No. 10 blue anl. sheets, St. L.	5.59c
No. 10 blue anl. sheets, Cincinnati	5.48c
No. 10 blue anl. sheets, St. Paul	5.745c
No. 10 blue anl. sheets, Detroit	5.48c
No. 28 black sheets, Chicago	6.52c
No. 28 black sheets, Cleveland	6.42c
No. 28 black sheets, Cincinnati	6.48c
No. 28 black, Detroit	6.48c
No. 28 black sheets, St. L.	6.59c
No. 28 black sheets, St. Paul	6.745c
No. 28 galv. sheets, Chicago	7.77c
No. 28 galv. sheets, Cleveland	7.67c
No. 28 galv. sheets, Cincinnati	7.73c
No. 28 galvanized, Detroit	7.73c
No. 28 galv. sheets, St. L.	7.84c
No. 28 galv. sheets, Buffalo	7.70c

IRON AND STEEL SCRAP

(Prices in Gross Tons)

STEEL WORKS USE

Bundled sheets, Cincinnati	$23.00 to 23.50
Bundled sheets, Pittsburgh	28.00 to 29.00
Bundled sheets, Cleveland	26.00 to 27.00
Bundled sheets, Buffalo	25.00 to 26.00
Boiler plate, cut, No. 1, Chicago	28.00 to 28.50
Boiler plate, cut, No. 1, St. Louis	26.50 to 27.00
Frogs, switches, guards, St. Louis	28.50 to 29.00
Frogs, switches, guards, Chicago	29.00
Heavy melting steel, Pittsburgh	29.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chicago	29.00
Heavy melting steel, Cleveland	29.00
Heavy melting steel, Cincinnati	28.00 to 28.50
Heavy melting steel, east. Pa.	28.00 to 29.00
Heavy melting steel, N. Y.	26.00
Heavy melting steel, St. L.	28.50 to 29.00
Heavy melting steel, Birmingham	27.00 to 28.00
Baled sheets, Cleveland	28.50 to 29.00
Baled sheets, Pittsburgh	28.00 to 29.00
Baled sheets, Chicago	29.00
Knuckles, couplers, Chicago	34.00
Knuckles, couplers, St. Louis	33.00 to 33.50
Low phos. steel, Buffalo	37.50
Low phos. steel, Pittsburgh	39.00
Low phos. crops, eastern Pa.	39.00
Low phos. guaranteed E. Pa.	36.50
Shoveling steel, Chicago	29.00
Shoveling steel, St. Louis	28.00 to 28.50
Steel rails, short, Chicago	34.00
Steel rails, short, Cleveland	34.00
Steel rails, short, St. Louis	32.50 to 33.00
Steel rails, old, Birmingham	29.00 to 30.00
Stove plate, Chicago	29.00
Stove plate, Cincinnati	22.50 to 23.00
Stove plate, St. Louis	25.50 to 26.00
Stove plate, N. J. points	27.25
Stove plate, Birmingham	25.00 to 26.00
Stove plate, Buffalo	28.50 to 29.00
Stove plate, eastern Pa.	29.00
Stove plate, Cleveland	25.00 to 25.50
Stove plate, Pittsburgh	29.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$1.40
Newark, N. J.	4.40
Boston	4.60
Philadelphia	4.10
Pittsburgh	1.40
St. Louis	4.60
Minneapolis, St. Paul	5.70
Buffalo to:	
Albany, N. Y.	$1.75
New England (rail)	3.90
New York and Brooklyn (rail)	3.90
Virginia furnaces to:	
Philadelphia	$4.10
New England	4.70
Brooklyn, Jersey City, Newark	4.40
Birmingham, Ala., to:	
Boston	$7.50
Cincinnati	3.60
Chicago	5.00
Cleveland	5.00
Louisville, Ky.	3.30
Minneapolis, St. Paul	7.30
New York (r. and w.)	7.50
Philadelphia (r. and w.)	6.50
Pittsburgh	6.10
Savannah, Ga.	3.40
St. Louis	4.25
Chicago to:	
Des Moines	$3.50
Minneapolis, St. Paul	2.50
Milwaukee	.60
Moline, Ill.	1.40
Omaha	4.50
St. Louis	1.90
Ironton and Jackson, O., to:	
Chicago	$3.75
Cincinnati	1.75
Cleveland	2.40
Detroit	2.60
Indianapolis	2.30
Minneapolis, St. Paul	5.70

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	24.5 cents
Philadelphia	23.0 cents
Boston	27.0 cents
Buffalo	21.5 cents
Baltimore	22.5 cents
Cleveland	17.0 cents
Cincinnati	23.0 cents
Chicago	27.0 cents
Detroit	23.0 cents
Minneapolis and St. Paul	49.5 cents
Denver	$1.09
St. Louis	33.5 cents
New Orleans	38.5 cents
Birmingham	57.5 cents
Pacific coast (all rail)	$1.25
Pacific coast (tin plate)	1.25

IRON MILL USE

Busheling, No. 1, Cleveland	30.50 to 31.00
Busheling, No. 1, Buffalo	29.00 to 30.00
Busheling, No. 1, Pittsburgh	30.00 to 30.50
Busheling, No. 1, Cincinnati	26.00 to 26.50
Busheling, No. 1, Chicago	30.50 to 31.00
Busheling, No. 2 Chgo.	21.50 to 22.50
Busheling, No. 1, St. Louis	30.00 to 30.50
Cast borings, New York	16.25 to 16.75
Cast borings, eastern Pa.	19.00
Cast borings, Buffalo	18.00 to 19.00
Cast borings, Cleveland	19.00
Cast borings, Cincinnati	17.00 to 18.00
Cast borings, Pittsburgh	19.00
Cast borings, Birmingham	17.00 to 18.00
Cast borings, Chicago	18.00 to 19.00
Cast borings, St. Louis	18.50 to 19.00
City wrought, long, N. Y.	30.00
Cut forge, Chicago	32.50 to 33.00
Forge No. 1, eastern Pa.	28.00 to 29.00
Grate bars, Buffalo	27.50 to 28.00
Grate bars, Cleveland	25.50 to 26.00
Grate bars, N. J. points	27.25
Iron axles, Pittsburgh	46.50
Iron axles, Cincinnati	43.50 to 44.00
Iron axles, Cleveland	46.50
Iron axles, Chicago	46.50
Iron axles, eastern Pa.	46.50
Iron axles, St. Louis	46.00 to 46.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	39.00
Iron rails, Buffalo	36.00 to 37.00
Iron rails, Cincinnati	34.00 to 35.00
Iron rails, St. Louis	38.50 to 39.00
Iron rails, Cleveland	37.00 to 38.00
Machine turnings, Cincinnati	18.00 to 18.50
Machine turnings, Cleveland	19.00
Machine turnings, Buffalo	18.00 to 18.50
Machine turnings, N. Y.	16.25 to 16.75
Machine turnings, Pittsburgh	18.00 to 19.00
Machine turnings, east. Pa.	19.00
Machine turnings, Birmingham	17.00 to 18.00
Machine turnings, Chicago	18.00 to 18.50
Machine shop turnings, St. Louis	18.50 to 19.00
Pipes and flues, Cleveland	28.00 to 29.00
Pipes and flues, Chicago	28.50 to 29.00
Pipes and flues, St. Louis	27.50 to 28.00
R. R. mach. cast, No. 1, Buffalo	34.00
R. R. wrgt. No. 1, Buffalo	34.00
R. R. wrgt. No. 1, east Pa.	34.00
Railroad wrgt. No. 1, Cincinnati	33.50 to 34.00
Railroad wrgt., No. 1, Cleveland	34.00
R. R. wrought, No. 1, Pittsburgh	34.00
Railroad wrgt., No. 2, Chicago	32.50 to 33.00
Railroad wrought, No. 1, Chicago	33.50 to 34.00
R. R. wrought, No. 1, Birmingham	31.00 to 34.00
No. 1 yard wrought, Eastern Pa.	33.00
No. 1 bushelings wrgt., East. Pa.	31.00
Sheet wrought, Pittsburgh	34.00
Railroad wrgt., No. 1, St. Louis	33.00 to 33.50
Railroad wrought, No. 2	32.00 to 32.50
Wrought pipe, Buffalo	27.00 to 28.00
Wrought pipe, East. Pa.	33.00
Wrought pipe, ungraded, East. Pa.	29.00

IRON OR STEEL WORKS USE

Axle turnings, Cleveland	$24.00
Axle turnings, Buffalo	24.00
Heavy axle turnings, East. Pa.	24.00
Heavy axle turnings, Pitts.	24.00
Shafting, New York	35.50
Shafting, East. Pa.	39.00
Steel car axles, Birmingham	38.00 to 40.00
Steel car axles, Pittsburgh	46.50
Steel car axles, New York	43.00
Steel car axles, Buffalo	44.00 to 46.00
Steel car axles, Cleveland	44.00
Steel car axles, East. Pa.	46.50
Steel car axles, Chicago	46.50
Shafting, St. Louis	38.00 to 39.00
Steel car axles, St. Louis	46.00 to 46.50

IRON FOUNDRY USE

Car wheels (iron), Pittsburgh	$29.00
Car wheels (steel), Pittsburgh	34.00 to 35.00
Car wheels, East. Pa.	29.00
Car wheels, Buffalo	29.00
Car wheels, Chicago	29.00
Car wheels, St. Louis	28.50 to 29.00
Car wheels, Birmingham	29.00 to 30.00
Car wheels, Cleveland	30.00
Tram car wheels, Birmingham	27.50 to 29.00
Cast, No. 1, Birmingham	31.00 to 34.00
Cast No. 1, cupola, East. Pa.	34.00
Cast, No. 1, Cleveland	33.00 to 34.00
Cast, No. 1, Cincinnati	33.00 to 34.00
Cast, 1, heavy, New York	32.25 to 32.50
Cast, 1, machy., New York	32.25 to 32.50
Cast, No. 1, Chicago	34.00
Cast, No. 1, Pittsburgh	32.50 to 33.00
Cast, No. 1, St. Louis	32.00 to 32.50
Malleable, Cincinnati	30.00 to 34.00
Malleable, Cleveland	30.00 to 34.00
Malleable, Buffalo	29.00 to 34.00
Malleable, Pittsburgh	33.00 to 34.00
Malleable, East. Pa.	29.00
Malleable, cupola, East. Pa.	33.00
Malleable, railroad, Chicago	34.00
Malleable, agricultural, Chicago	33.00 to 33.25
Malleable, railroad, St. Louis	32.00 to 32.50
Malleable, agricultural, St. Louis	31.00 to 31.50

MISCELLANEOUS USES

Boiler punchings, Chicago	36.00 to 36.50
Reroll. rails, 5 ft. and over, Pitts.	34.00
Reroll. rails, 5 ft. and over, Chi.	34.00
Reroll. rails, 5 ft. and over, E. Pa.	34.00
Reroll. rails, 5 ft. and over, St. L.	33.50 to 34.00
Reroll. rails, 5 ft. or over, Cleve.	34.00
Rerolling rails, long, Birmingham	37.50 to 38.50
Locomotive tires, Chicago	45.50 to 46.50
Locomotive tires, St. Louis	42.50 to 43.00